

Innovative Optronics Instrumentation

Duma Optronics was established in 1989 by a group of entrepreuneuring researchers to serve the optronics instrumentation market with innovative products.

The 15 person R&D group includes specialists in optical design, E-O systems, electronic signal processing and computerized imaging. Their fertile interaction resulted in a number of innovative solutions to optronics instrumentation problems with universal applications.

As can be judged From this product sample, the Duma Optronics strength lies in combining:

- A wide spectrum of technical disciplines
- A strong spirit of innovation
- A practical, application-oriented approach to High-Tech.

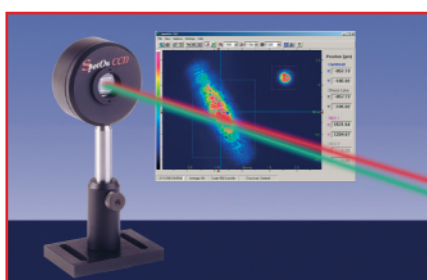
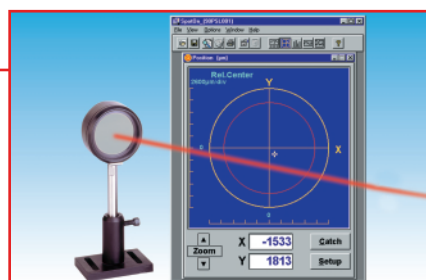
The unique state-of-the-art technology developed and owned by Duma Optronics is under patent pending.

We offer a wide variety of computerized measurement systems, providing more sophisticated and cost-effective solutions to numerous applications.

DUM SPOT L44

Beam Positioning Measurement

Monitors beam position and power using a large detection area. Based on a Lateral Effect detector for the VIS range. Plug-in type device which handles one or two PSDs simultaneously.



SpotOn CCD USB 2.0

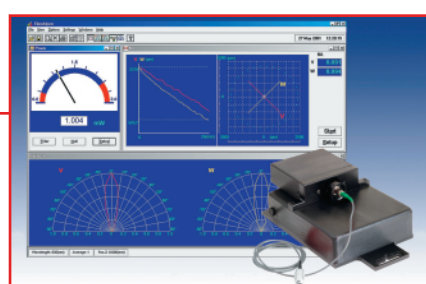
Multiple Beam Positioning

Measures both CW and pulsed beams, up to 3 beams simultaneously. Wide spectral range, from UV through IR. High accuracy measurement, less than 5 μ m deviation edge-to-edge and sub-micron resolution for minute movements. PCI / USB 2.0 interface

FiberAlyzer

Goniometric Radiometer for diode/fiber analysis

A characterization instrument for the angular radiation intensity of light. The device measures N.A., power, angular width ratio and angular position with respect to the optical axis.



M² Beam

M² Measurement System

Multi-function device, measuring the 2-axis M² figure of CW lasers, waist size and its location. The M² factor is measured in accordance with the proposed ISO standard ISO/CD11 146.

FiberPower

Simultaneous Measurements of Optical Power

A multi-channel optical power meter for CW beams for the near infrared. Compare between channels and get information on attenuation, stability, long term performance and Pass/Fail testing.



DUMA OPTRONICS LTD.

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Innovative Optronics Instrumentation

Our entrepreuneuring researchers have broaden the area of applications into new Optronics Instrumentation and now offering innovative products for the communication industry.

QC of laser beams and optical systems, alignment of laser beams, multiple beam positioning and power measurement for WDM/DWDM, laser diode/fiber optic far-field angular radiation, collimation measurements. On-line monitoring of beam characteristics.

Complete test stations for the fiber optics and optronics markets.

By using fast analog electronics and signal processing a new breed of fast positioning instrumentation is now available. Responding to the increasing demand and challenging new micronic laser beams, a practical and application oriented instrument for micronic beams was developed, and is offered for both the visible and IR markets.

The unique state-of-the-art technology enables simultaneous measurements of multiple parameters, such as : the AlignMeter system, where positional and angular beam deviations are measured and displayed, or the OctaPower system measuring up to 8 power channels simultaneously.

Following our expertise and innovation spirit we provide you with a practical application-oriented approach for your measurement needs.

AlignMeter

Optical Beam Alignment

Simultaneous measurements of Position and Angular displacements. Position accuracy down to 1 μ m and Angular accuracy down to μ Rad. Offered as plug-in type device (ISA/PCI/PCMCIA) or as a Stand-Alone instrument.



SpotOn Analog

Fast Beam Positioning

Measures position and power of a Lateral Effect PSD, resolution down to 1 μ m. Fast (up to 60 KHz bandwidth) and compact design. Also offering an A/D board and a receiving program under Windows for fast digital positioning applications.

OctaPower

Multi Channel Power Meter

Measures CW optical power of lasers & laser diodes, up to 8 channels simultaneously, using either Si detectors , InGaAs detectors with fiber optic attachments, or UV-Enhanced detectors. Powerful device enabling math operations and comparisons between measuring channels.



μBeam

Microscopic Beams Analyzer

Measures microscopic beams of less than 0.5 μ m, both CW or pulsed beams. A wide spectral range is available. Offered as a plug-in type device (PCI) or as a Stand Alone unit which is perfect for an industrial environment.

FocusGage

Depth-of-Focus & Divergence

Measures the 2-axis depth-of-focus, beam waist size and location, divergence (N.A.) of CW lasers. Based on Si , UV-Enhanced or InGaAs detector heads. Offered with a Stand Alone self contained instrument.

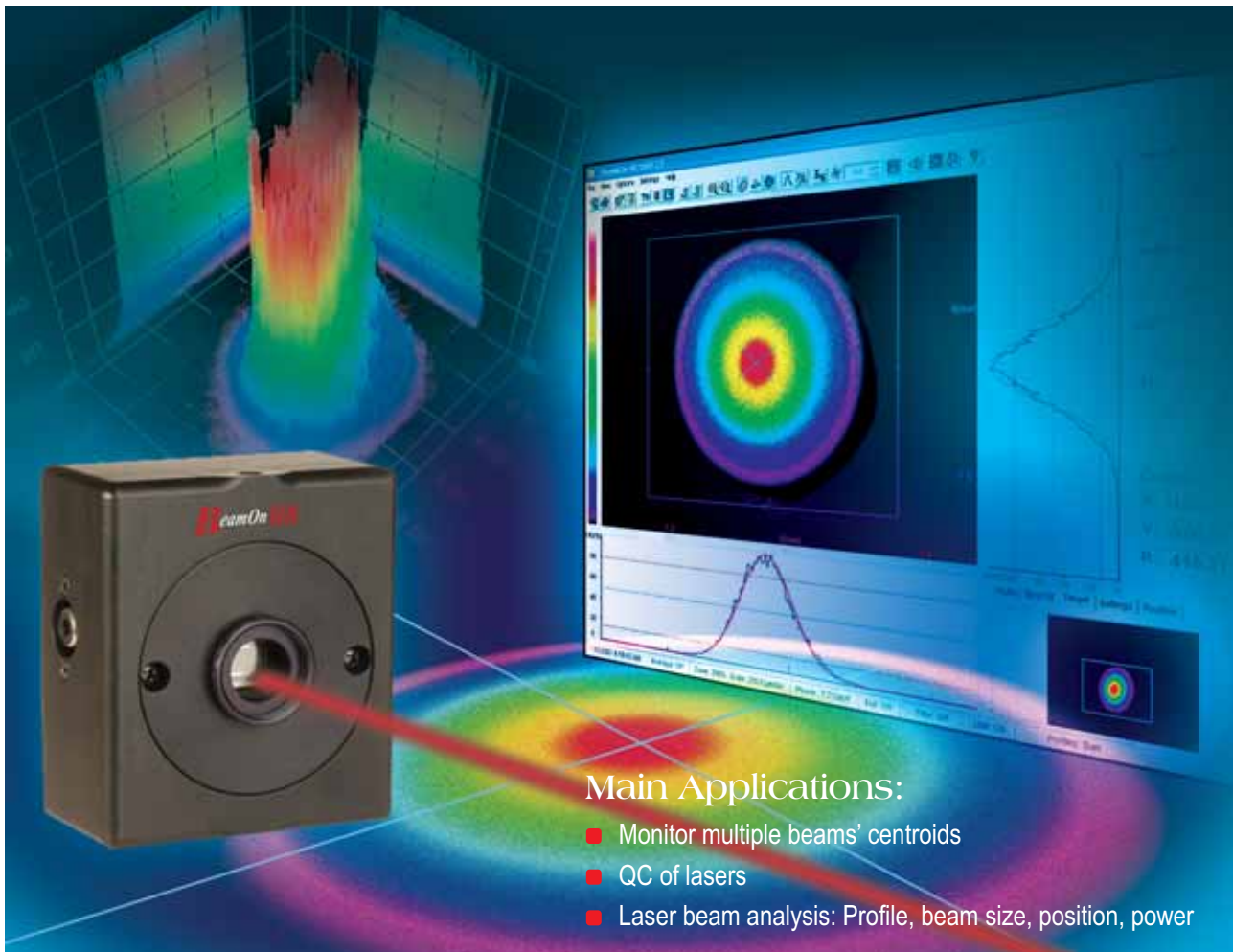


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BeamOn HR

1.4 Megapixel CCD Beam Profiler
12 Bit resolution



Main Applications:

- Monitor multiple beams' centroids
- QC of lasers
- Laser beam analysis: Profile, beam size, position, power

Expanding your profiling capabilities

- **Accurate:** High resolution CCD having 12 bit true dynamic range
- **Versatile:** A complete test station measuring Profile, Power and Position, both for CW and pulsed beams
- **Portable:** Based on a USB 2.0 interface for notebooks (or desktops)
- **Easy to use:** user-friendly software, on-line help routine
- **Accessories:** Complete set for larger beams and high power attenuation

Main Software Features

- Real time beam size and gaussian fit (or top hat)
- 2D/3D plots of beam in real time
- Beam centroid tracking and chart with time
- Software controlled electronic shutter & gain
- Video with playback, snapshot files
- Data exporting to another computer via RS232 or TCP/IP
- Data logging with detailed statistics
- ActiveX package to control software from your application
- Automatic Pass/Fail analysis report



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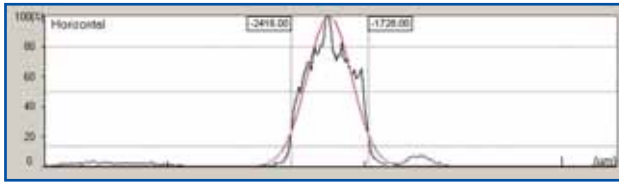
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SeongKyeong Photonics



Software Features

Beam Profiles and Width



Horizontal Profile with overlaid Gaussian Profile

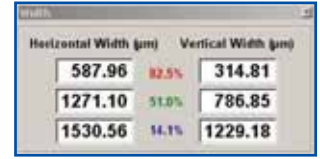
Two types of profile presentations are offered:

Sum Profiles-Display the two orthogonal profiles, one along the vertical axis and one along the horizontal axis. Each profile is composed of a summation of rows and columns at a cross-section.

Line Profiles-Display the beam contour along a line parallel to the vertical and horizontal axes. These two orthogonal lines are designated as a cross hair cursor on the image plane and can be moved along the working area. It is possible to rotate the line profiles by +/-50 degrees for analyzing the intensity profile along a certain line and angle of interest.



Best fit results



Beam width results

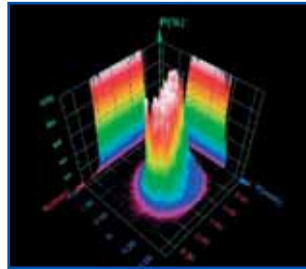
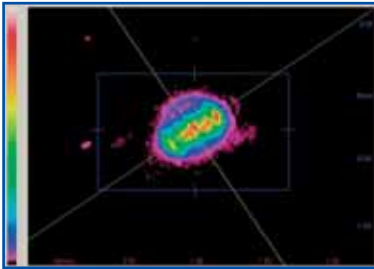
Beam widths are digitally displayed for any three user selected clip levels. Two vertical bars can be moved along the horizontal axis designating the distance (in µm) along this axis.

A Gaussian fit profile can be overlaid on the profiles in real time, while the correlation and fit values are displayed digitally. A Top Hat profile presentation and best fit is also available.

The software offers various algorithms for beam width calculation:

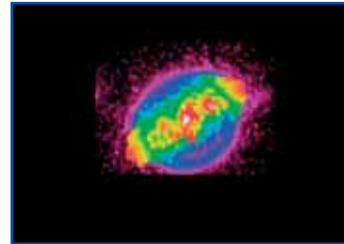
- Percent of Peak
- 84/16 Knife Edge -90/10 Knife Edge

2D and 3D Intensity Plots

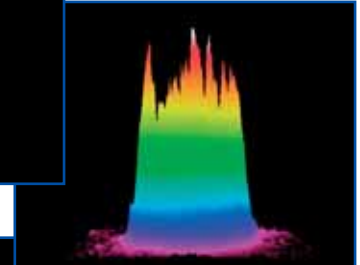


The Projection function provides either a 2D or a 3D plot of the beam intensity profile. A zooming feature enables magnification of the displayed image. For a weak beam image, even at max shutter and gain settings, optimize colors using the side color bar.

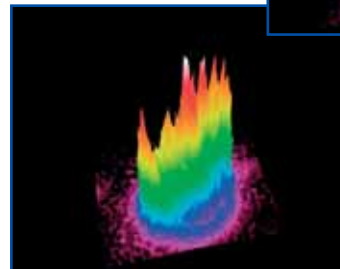
3D Projection enables viewing the 3D plot with projected images over the X and Y axes.



3D Plot-top view



3D Plot-side view



3D Plot

The 2D/3D plots can be rotated along the beam optical axis, as well as be flipped. This feature enables the user to view the image from various angles around the beam.

Power Measurement



The beam power is displayed as a digital readout at the status bar, as well as at the right-hand screen panel, where there is also a

display of the "Z" digital value in a specific cursor location (in 8 bits or 12 bits).

Alternatively, a needle-type display is available with additional features like: changing power measuring units, averaging, loading a pre-defined filter file, ambient light suppression. A power calibration function allows the user enter a "base" power value. In subsequent captured images the summed intensity of all pixels will be proportional to this value.



Software Features

Beam Position & Chart



The beam centroid is continuously monitored relative to the center of the CCD head. Three Regions of Interest (ROI) can be defined by the user, thus enabling to monitor of up to 3 beams' centroids simultaneously. The display includes the values of X and Y (in μm) as well as R, which is the distance from the CCD center. Trace On/Off feature enables beam centroid tracking.

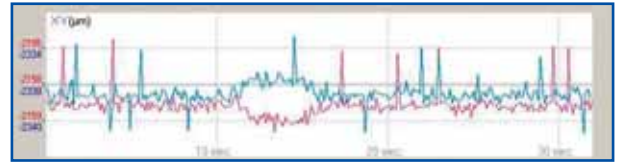


Chart Position function is used to display changes in the position (X and Y) with time, with autoscaling and saving capabilities.



Reticule type targets can be laid out on the position screen, for ease of positioning analysis. The following targets can be used: Cross, Circle, Square, multiple circles and multiple squares.

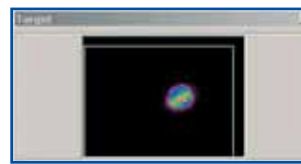


Detailed Statistics

The information in Statistics screen is updated in real time and is useful for analyzing beam characteristics. It lists the information in a table format and shows the actual measurement values, as well as the minimal measurement, the maximal measurement, the averaged value, and the standard deviation of several parameters:

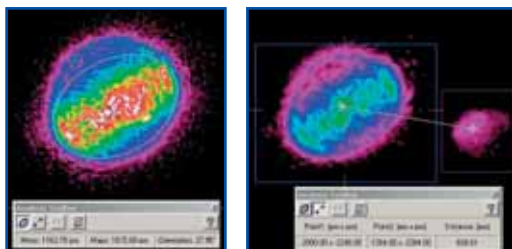
- Beam Centroid
- Beam Peak
- Beam width at 3 clip levels
- Correlation to Gaussian profile
- Power

Beam finding Module – Target



A special feature, which facilitates finding your area of interest within the total CCD area. It is derived from the high-resolution CCD feature, where the resolution is much higher than the screen display capabilities. Your area of interest is clearly displayed as a small rectangular frame within a picture representing the CCD module. Move the small rectangle frame to explore other portions of the CCD area.

Analysis, QA Testing & Report



The ellipse function calculated the best fit ellipsoid for the examined beam. The major and minor axes of the fit ellipse are calculated as well as the orientation of the major axes of the fit.

The distance measurement function calculates the distance between any two points on the beam image, the points are being selected by the user.

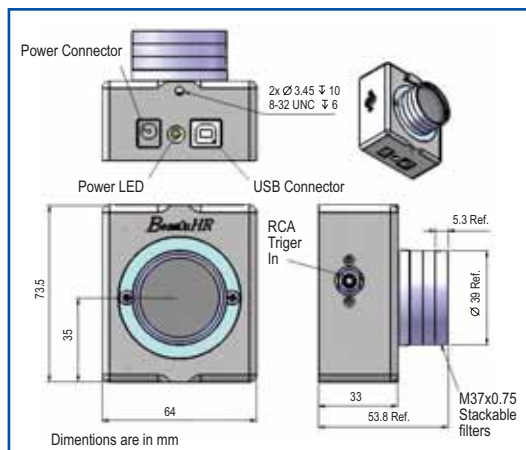
The Test routine allows the user to test a laser beam based on user-defined Pass/Fail criteria. The test results are calculated for any one of the beam selected parameters.

A wealth of beam analysis features

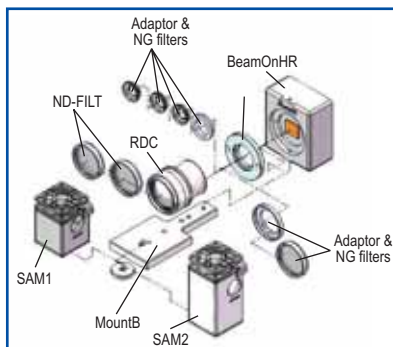
- Data logging to a Text file, or to an Excel file
- Averaging
- Zooming
- Printing of Text and pictures
- User set threshold levels
- Full on line Help routine
- Live Snapshot files replay for complete analysis of results
- Capture up to 12 still images and tile them in matrix format
- Sophisticated report in Excel format including mixed text & images
- Full session recordings for off-line analysis
- Customer set Pass/Fail criteria
- External trigger controle



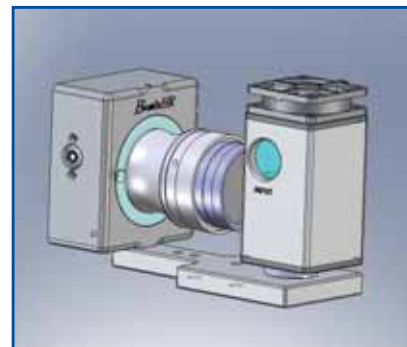
Specifications



CCD Head Drawing



Full accessories set



Accessories combination

CCD Head Specifications

Camera Type:	Monochrome interline transfer progressive scan, 1.4 Megapixel CCD 1/2" format
Pixel size:	4.65μmX4.65μm
Sensor active area:	7.6mmX6.2mm
Weight:	165 gr.
Trigger in:	RCA female jack, 4.5V square wave TTL
Power consumption:	6V, 4Watts
Mounting threads:	M30x0.75 and 1"X32 (C-Mount)
Accessories included:	3XND 1.8 filters in housing about 500:1, mounting post, adaptor ring for filters

System performance with software

Spectral response:	350-1310nm
Max frame rate:	15fps at 1392x1040, 30 fps with binning (2X)
Image resolution:	1392X1040
Shutter speed:	0.6sec to 1μsec
Gain control:	X1 to X23
Dynamic range:	60DB not including filters
Damage threshold:	50W/cm ² with filters
Sensitivity:	5nW/cm ² @ 633nm, 60μW/mm ² @ 1310nm
Saturation:	2mW/cm ²
Operation with pulsed lasers:	Ability to capture and replay images from slowly pulsing lasers (1-100Hz) while filtering out frames with no laser pulse. Provision for displaying single shot pulses.
Hardware triggering:	in pulsed mode set threshold by slide bar to display frames with captured pulses

General Specifications

PC interface:	High speed USB2.0 (480Mbits/sec)
RS232:	Data out
Operating temp:	0°C to 50°C
Humidity:	5% - 95% non-condensing
CE compliance	

Host computer Requirements

Pentium IV 2GHz , 512MB RAM , 10MB Free HDD
64MB 24 bit color VGA card, resolution (min) 1024x768,
1 Free High Speed USB2.0 port, CD ROM any type, Win XP

Ordering Information

BeamOnHR	The system comes with a camera, a standard USB2.0 cable, a post, a set of 3XND filters in housing, power supply 6V DC, software on CD disk, carrying case.
Accessories:	
SAM1	Beam sampler (ratio 3X10 ⁽⁻³⁾)
SAM2	Beam sampler (ratio 1X10 ⁽⁻⁶⁾)
RDC	Beam reducer (ratio 2.5X1)
MountB	Mounting base
ND-FILT	1/8 ND filter, M37X0.75
NG-Filters	1.6mm thick Schott colored filter in mount with adaptor, types: NG4 / NG9 / NG10
Acc-Set	Full set of accessories (see sketch)



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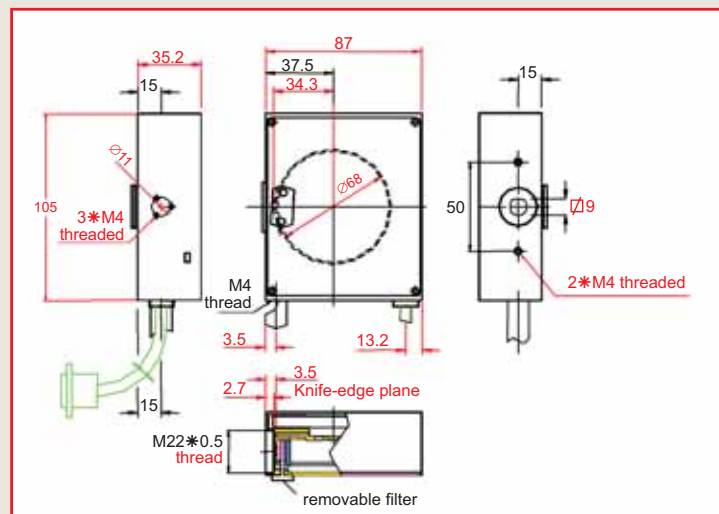
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SeongKyeong Photonics

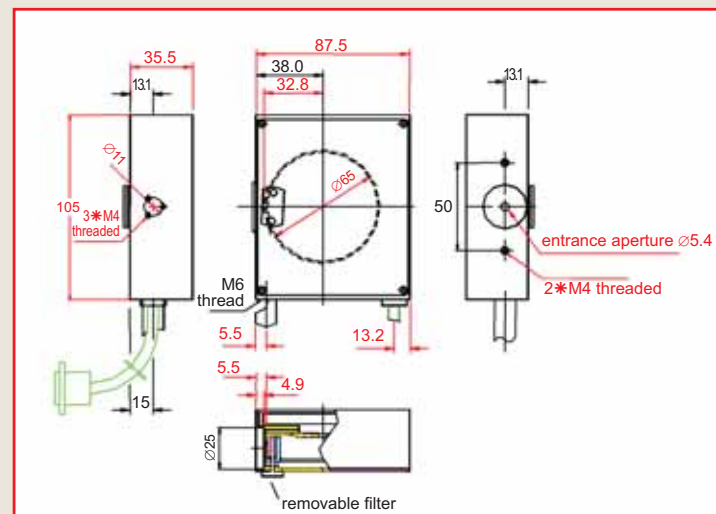


Specifications

BA7 Head Drawing



BA3 Head Drawing



Dimensions are in mm

Sensor type	Silicon (Si), UV-Silicon (UV-Si) or InGaAs (IR)
Wavelength range	Si 400-1100nm UV-Si 190-1100nm IR 800-1800nm
Number of blades	3 for BA3 heads, 7 for BA7 heads
Beam size range	3µm-5mm for BA3-Si and BA3-UV 15µm-10mm for BA7-Si and BA7-UV (Oval) 15µm-9mm for BA7-Si and BA7-UV (Round) 3µm-3mm for BA3-IR3 15µm-3mm for BA7-IR3 3µm-5mm for BA3-IR5 15µm-5mm for BA7-IR5
Beamwidth resolution	1µm for beams > 100 µm in size, 0.1µm for beams < 100µm in size
Beamwidth accuracy	±2%
Power accuracy	±5% for Si and UV-Si heads, ±10% for InGaAs heads
Power range	10µW to 1W with filters for Si and UV-Si heads, 10µW to 5mW (no filters provided) for the InGaAs heads
Saturation	0.1 W/cm² without filter, 20W/cm² with NG9 (Si and UV-Si)
Power resolution	0.1µW
Position accuracy	±15µm
Position resolution	1µm
PC interface	½ size P&P PCI card
Temperature	-10° to 50°C
Sensor head weight	755 Gram with cable
Measurement rate	5Hz
CE Compliance	

Host Computer Requirements

Pentium III, 128MB RAM, 10MB Free HDD, 8 MB 16 bit VGA card, CD ROM any type, 1 free ½ size PCI slot, OS: Windows 98/ME/NT 4.0/2000/XP

Ordering Information

The system consists of a measuring head with 2.5m long attached cable, a post, ½ length PCI card, NG4 and NG9 filters in housing (for Si and UV-Si heads), software on CD disk, carrying case.

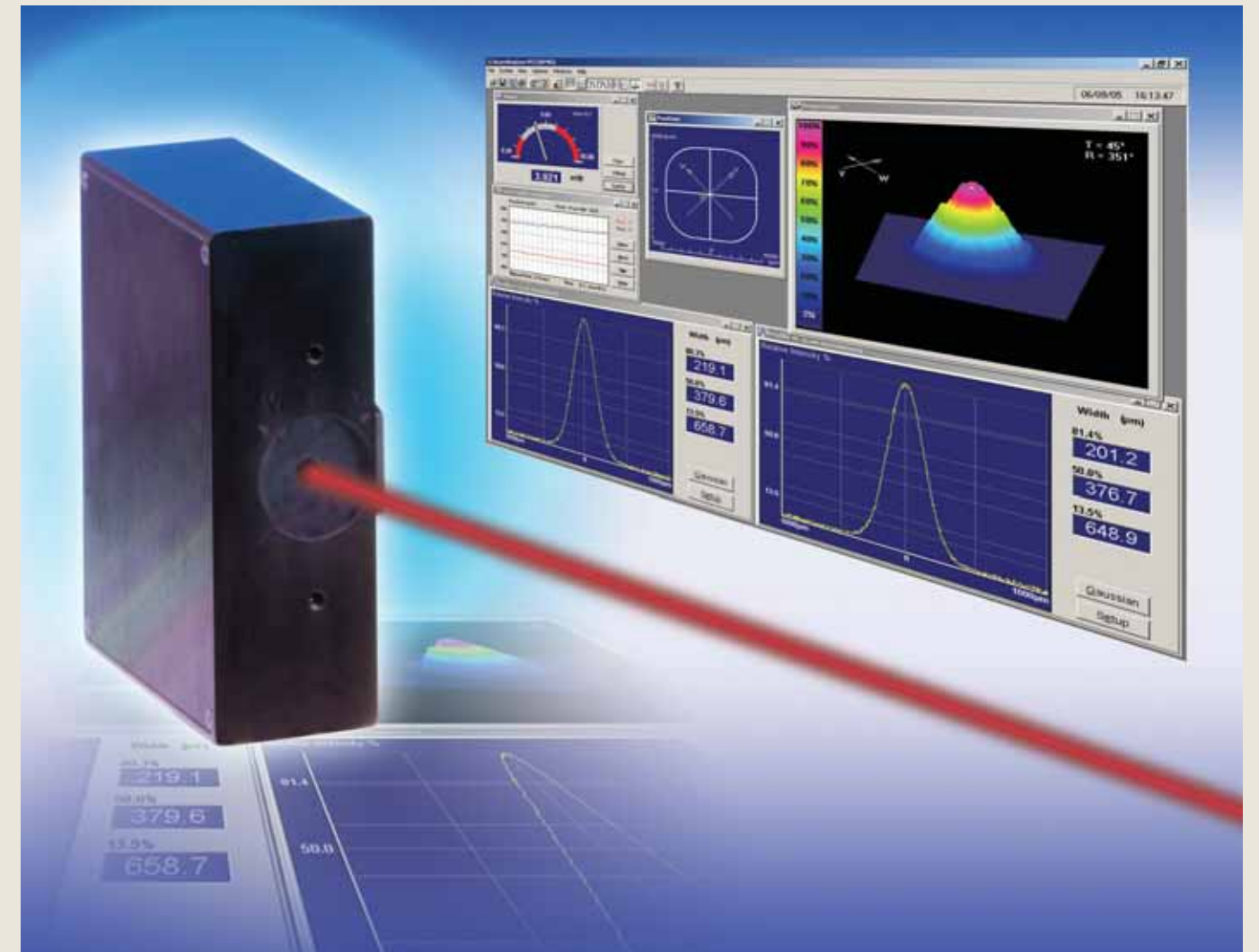
BA3-Si	3-blades, Si detector 5mm circular
BA7-Si	7-blades, Si detector 9mm square
BA3-UV	3-blades, UV-Si detector 5mm circular
BA7-UV	7-blades, UV-Si detector 9mm square
BA3-IR3	3-blades, InGaAs detector 3mm circular
BA7-IR3	7-blades, InGaAs detector 3mm circular
BA3-IR5	3-blades, InGaAs detector 5mm circular
BA7-IR5	7-blades, InGaAs detector 5mm circular

Optional Accessories

BA-Fiber	A fiber adapter with an FC connector designed to fit onto the aperture of the BA head close to the knife-edge aperture.
BA-Mount	An optional mount is available to enable rotation of the BA head about the Optical axis. The mount has 360 degree calibrated scale with locking screw.

Beam Analyzer

Multiple Scanning Knife-Edge Beam Profiler



High precision beam diagnostics for CW lasers

- **Patented technology:** Unique tomographic image reconstruction of 2D/3D images
- **Versatile:** Measure beam profile, beam size, beam shape, position and power
- **Flexible:** Wide spectral range, from 190nm through 1800nm
- **Accurate:** Beam sizes from 3µm to 9mm with 0.1µm resolution
- **Compact:** Based on a PCI card, measuring head, software

Main Software Features

- Real time beam profiles, beam size and gaussian fit
- 2D/3D plots of beam in real time
- Beam centroid and ellipticity, Power measurement
- Direct data logging to Excel files
- Data streaming via RS232 or TCP/IP
- Save image and snapshot files
- Automatic Pass/Fail analysis report
- ActiveX software for integration in user's program



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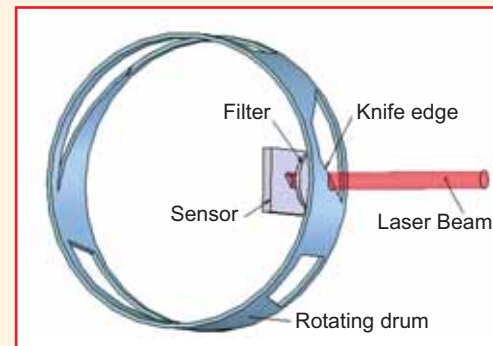


Patented Technology

The Beam Analyzer provides a bridging technology, producing the 3D intensity reconstruction of CCD cameras, while being capable of measuring very small spots at high resolution and huge dynamic range

The measuring technique is based on a multiple scanning knife-edge technology, combined with a tomographic image reconstruction for the creation of the 2D/3D display. When the drum spins, the knife-edges cut across the beam in an orthogonal plane to the direction of propagation. A stationary large detector inside the spinning drum measures light intensity. For attenuation, when needed, a built-in distortion free optical filter is inserted between the spinning drum and the detector. This technique provides the required attenuation without affecting beam quality. Each scanning knife-edge is oriented at a different angle on the drum and moves across the beam path in a different direction as the drum rotates. Consequently, during a single rotation of the drum, the instrument generates a set of profile curves, each representing the intensity profile of the beam from a different direction. This data is the input for the tomographic reconstruction algorithm to generate the 2D/3D intensity profile of the beam.

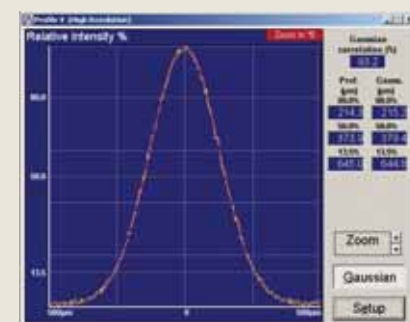
The **Beam Analyzer** is offered in two types of measuring heads: The BA7 uses seven individual knife-edges, providing more accurate measurement of the true beam shape and dimensions by gathering data from all 7 scans, while the BA3 uses only three knife-edges, and is recommended for smaller beams measurement as well as for a near-Gaussian beams. The more knife-edges, the greater the level of detail obtained. For a beam distribution that is significantly non-Gaussian the BA7 would reconstruct a plot that closely matches the real beam.



System Presentations

Beam Analyzer provides an extensive range of graphical presentations and analysis of laser beam parameters.

Beam Profiles and Width

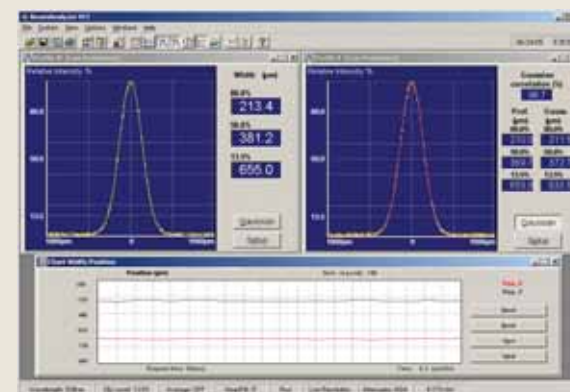


Beam Analyzer' control software simultaneously displays two profiles from two orthogonal knife-edges, or show each profile individually for greater visual detail. These main profiles, located at 45 degrees from the base of the head, are called "V" and "W".

Beam widths are digitally displayed for any three user selected clip levels, with up to 0.1 μm resolution. The beam profile displays are auto-scaled (optional) to maximize on-screen detail and resolution. Added detail can be obtained in a special high-resolution mode. A Gaussian fit profile can be overlaid on profiles in real time, while the correlation and fit values are displayed digitally. Zoom function automatically increases the displayed spatial resolution.

Chart mode

It is frequently necessary to monitor the Beam Width (or alternatively Beam Position) as a function of time. In Chart Mode, these parameters can be viewed in strip chart format, showing long term time-dependent stability or drift. The measured data can be viewed on screen, saved or printed for further analysis.



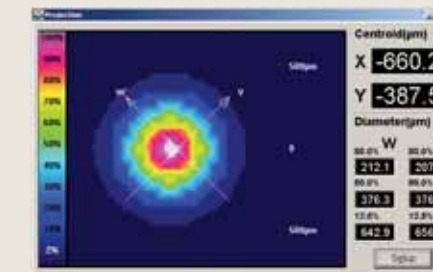
System Presentations (cont.)

2D and 3D Intensity Plots

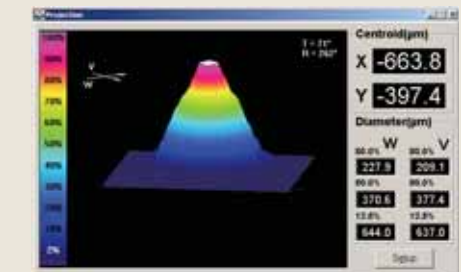
The Projection function provides either a 2D or a 3D plot of the beam intensity profile, and is created using reconstructive tomography.

The 2D contour maps and the 3D isometric plots can be displayed with or without scan axis and grids. These plots can be rotated along the beam optical axis, as well as be flipped. This feature enables the user to view the image from various angles around the beam. It is also possible to control the 3D plot wire density.

Data about the beam size and centroid position is displayed digitally along with centroid and beam size data.



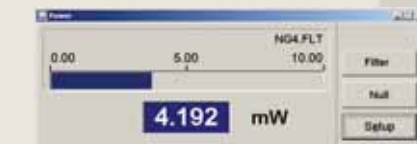
2D Plot



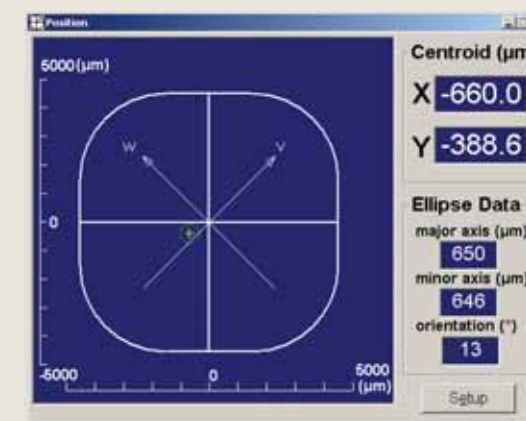
3D Plot

Power Measurement

The beam power can be displayed either as a digital readout, or as a bar-type display or in combination with an analog "needle". Power presentation units can be chosen as mW, μW or dBm. The user can offset the zero to deactivate the ambient light suppression. Pre-defined filter transmission files can be selected. A test range can be defined and displayed to monitor beam power within specific limits, audio alarms are optional.



Beam Position and Ellipticity



The beam centroid position is continuously monitored relative to the center of the sensor area in real-time, along with beam shape, ellipticity (major and minor axes) and angular orientation. A zoom function is available for viewing the footprint of small beams more clearly.

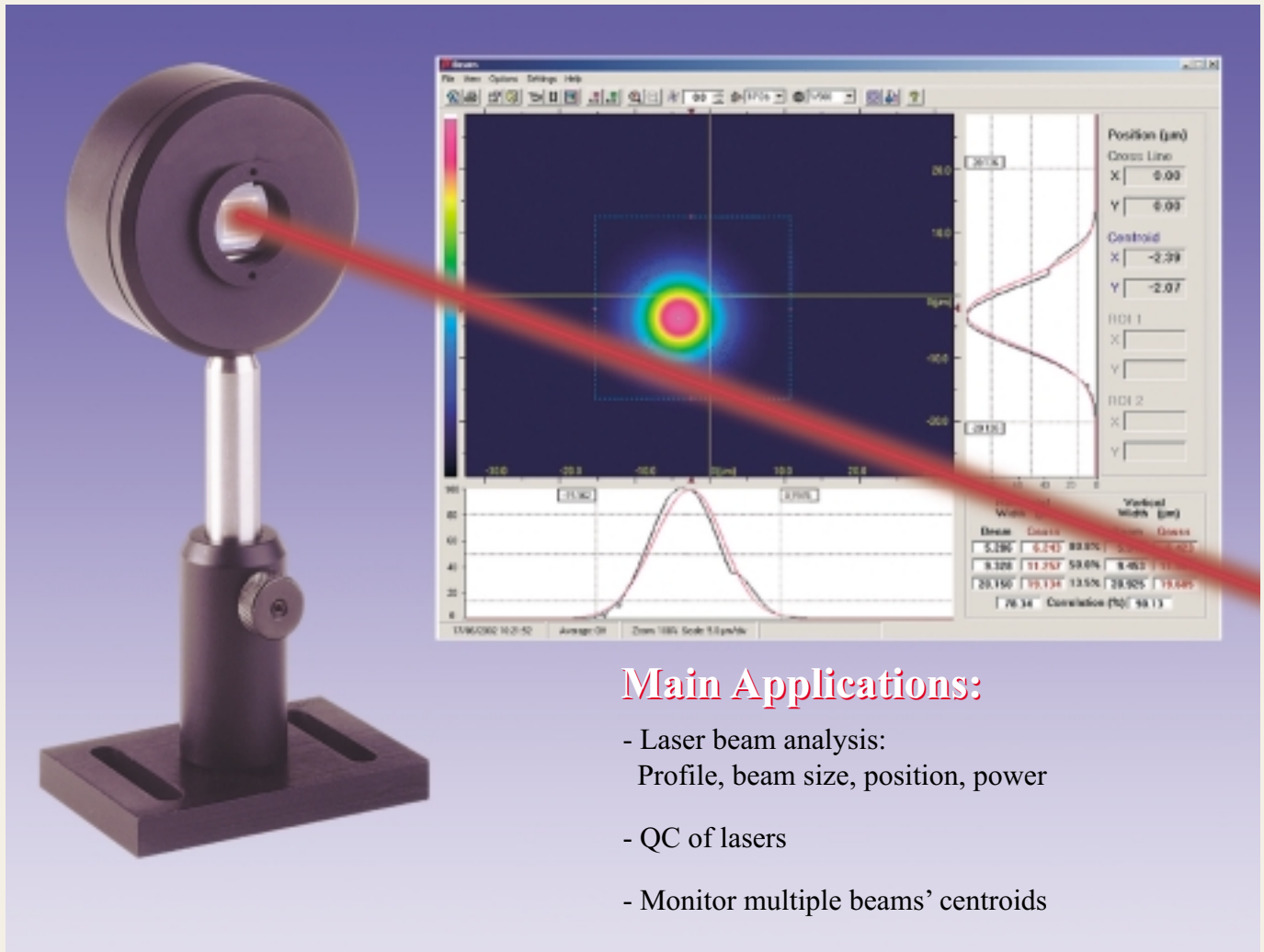
Observing beam position stability versus time is available upon setting up of the Chart function to monitor beam position at the selected clip level.

More Software Features

- Pass/Fail testing can be performed on measured results for acceptance within specific tolerances.
- Data logging to a Text file or to Excel file
- Live Snapshot files replay for complete analysis of results
- Average setting, Zooming
- TCP/IP communication protocol and remote control
- Data transmission via RS-232 link to another computer
- Slave Mode controlling the measurements upon request
- Screen images can be saved as BMP/JPG files or printed out
- ActiveX software for integration in user's application program



BeamOn *CCD Beam Profiler*



Main Applications:

- Laser beam analysis:
Profile, beam size, position, power
- QC of lasers
- Monitor multiple beams' centroids

Expanding your profiling capabilities

- **Patented technology:** Wide dynamic range enabled by double sampling technology
- **Versatile:** A complete test station, measures both CW and pulsed beams
- **Flexible:** A wide spectral response from deep UV (190nm), VIS and up to 1550nm
- **Portable:** Based on a USB 2.0 attachment for notebooks, or on a PCI card
- **Easy to use:** user-friendly software, on-line help routine

Main Software Features

- Real time beam size and gaussian fit
- 2D/3D plots of beam in real time
- Software controlled electronic shutter & gain
- Video with playback, snapshot files
- Data exporting to another computer via RS232
- Data logging with detailed statistics
- ActiveX package to control software from your application
- Automatic Pass/Fail analysis report



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SeongKyeong Photonics

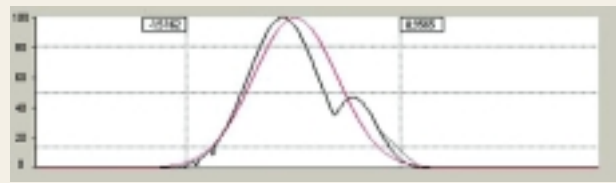


System Presentations

BeamOn provides an extensive range of graphical presentations and analysis of laser beam parameters.

Beam Profiles and Width

Two types of profiles are being displayed;
Sum Profiles-Displays the two orthogonal profiles, one along the vertical axis and one along the horizontal axis. Each profile is composed of a summation of rows and columns at a beam cross-section.



Horizontal Profile

Line Profiles-Displays the beam contour along a line parallel to the vertical and horizontal axes. These two orthogonal lines are designated as a cross hair cursor on the image plane and can be moved along the working area.

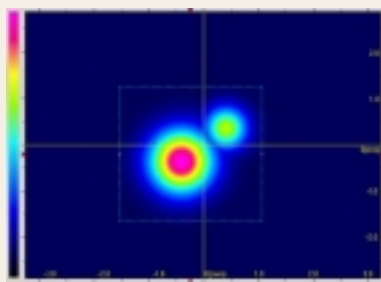
Horizontal Width (µm)			Vertical Width (µm)		
Beam	Gauss	Corr	Beam	Gauss	Corr
528.8	624.3	88.8%	594.6	642.3	
932.8	1125.7	58.8%	945.3	1158.1	
2815.3	1813.4	13.6%	2952.5	1968.5	
78.34			Correlation (%) 99.13		

Results

Beam widths are digitally displayed for any three user selected clip levels.

A Gaussian fit profile can be overlaid on profiles in real time, while the correlation and fit values are displayed digitally. A Top Hat profile presentation and fit is also available.

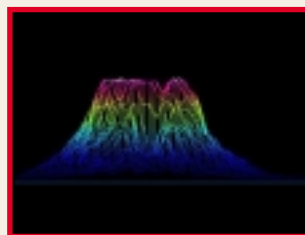
2D and 3D Intensity Plots



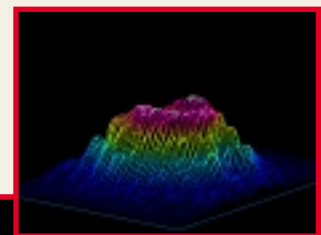
Beam Intensity Pallet

The Projection function provides either a 2D or a 3D plot of the beam intensity profile. A zooming feature enables magnification of the displayed image. It is possible to control the 3D plot wire density. For a weak beam image, even at max shutter and gain settings. Use the beam intensity pallet to optimize color display.

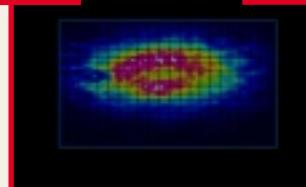
The 3D plot can be rotated along the beam optical axis, as well as be flipped. This feature enables the user to view the image from various angles around the beam.



3D Plot - side view



3D Plot - top view



2D Plot

Power Measurement

The beam power is displayed as a digital readout at the status bar. A power calibration function allows the user enter a “base” power value. In subsequent captured images the summed intensity of all pixels will be proportional to this value.



System Analysis

BeamOn provides an extensive range of laser beam parameters calculation and analysis.

Beam Position

The beam centroid is continuously monitored relative to the center of CCD head. Three Regions of Interest (ROI) can be defined by the user, thus enabling the user to monitor up to 3 beams' centroids simultaneously.

Detailed Statistics

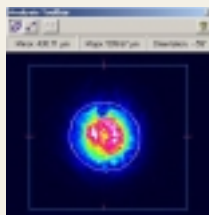
The information in Statistics screen is updated in real time and is useful for analyzing beam characteristics. It lists the information in a table format and shows the actual measurement values, as well as the MIN (minimal measurement), MAX (the maximal measurement), AVER (the averaged value), and STD (the standard deviation) of several parameters which are crucial for beam analysis:

- Centroid (H / V profiles)
- Beam Peak (H / V Profiles)
- Beam width at 3 clip levels (H / V Profiles)
- Correlation to Gaussian profile (H / V Profiles)
- Power (mW)

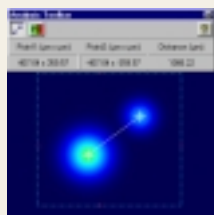
Parameter	Current	MIN	MAX	AVER	STD
Centroid (um)					
Horizontal	486.43	486.43	486.43	486.43	0.000
Vertical	117.98	117.98	117.98	117.98	0.000
Beam Peak (um)					
Horizontal	486.43	486.43	486.43	486.43	0.000
Vertical	117.98	117.98	117.98	117.98	0.000
Beam Width (um)					
Horizontal	118.88	118.88	118.88	118.88	0.000
Vertical	118.88	118.88	118.88	118.88	0.000
Correlation					
Horizontal	0.999	0.999	0.999	0.999	0.000
Vertical	0.999	0.999	0.999	0.999	0.000
Power (mW)					
Current	0.000	0.000	0.000	0.000	0.000

Statistics

Analysis and QA Testing



Elipse estimation



Distance measurement

Test Item	Unit	Value	Pass/Fail
Beam Width (Horizontal)	um	118.88	Pass
Beam Width (Vertical)	um	118.88	Pass
Beam Peak (Horizontal)	um	486.43	Pass
Beam Peak (Vertical)	um	117.98	Pass
Beam Centroid (Horizontal)	um	486.43	Pass
Beam Centroid (Vertical)	um	117.98	Pass
Beam Correlation (Horizontal)		0.999	Pass
Beam Correlation (Vertical)		0.999	Pass
Beam Power (mW)	mW	0.000	Pass

Test

The software enables a best fit to an ellipse as well as direct distance measurement.

The **Elipse function** calculates the best-fit ellipsoid for the examined beam. The major and minor axes of the fit ellipse are calculated as well as the orientation of the major axes of the fit.

The **Distance measurement function** calculates the distance between any two points on the beam image, the points are being selected by the user.

The **Test routine** allows the user to test a laser beam based on user-defined Pass/Fail criteria. The test results are calculated for any one of the beam calculated parameters.

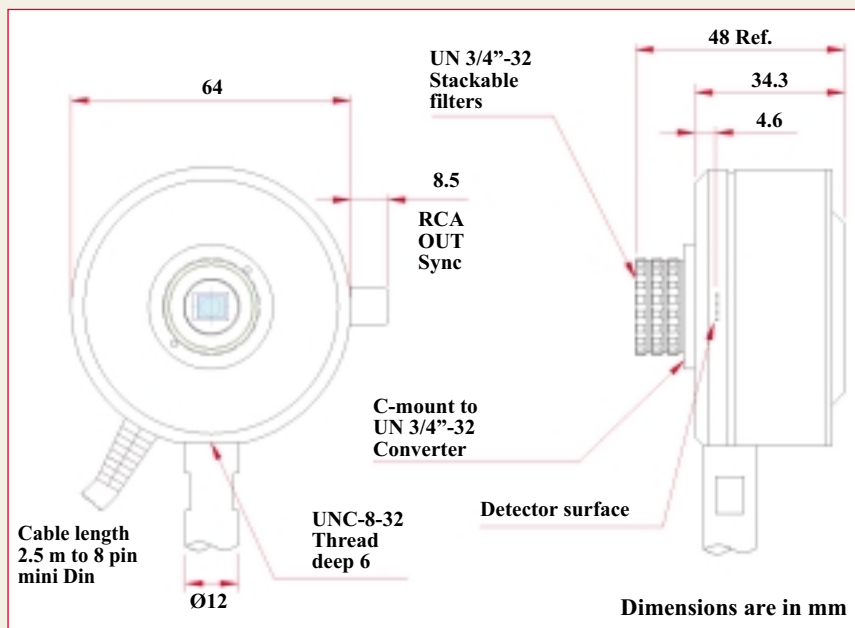
More Software Features

- Data logging to a Text file (up to 99 hours)
- Average
- Zooming
- Printing of text and images
- User set threshold levels
- Full on line Help routine
- Live Snapshot files replay for complete analysis of results
- Capture up to 12 still images
- Setup for different camera types (for PCI version)
- Multiple PCI boards operation (Windows 2000/XP)
- Full session recordings for off-line analysis (Mpeg)
- Customer set Pass/Fail criteria
- Tile images in matrix format
- Direct link to Duma's website for support



Specifications

CCD Head Drawing:



CCD Head Specifications

Camera type:	Monochrome interline transfer CCD •” format
Pixel size:	8.6µm(H)X8.3µm(V)
Sensor active area:	6.47mmX4.83mm
Weight:	295 gr. with cable
Sync out:	RCA female jack, 4.5V square wave TTL output
Power consumption:	5V, 0.9Watts
Accessories included:	3XNG 1.6mm thick Schott colored filters in housing about 240:1 (wavelength dependent), cap, mounting post



General Specifications

PC interface:	1/3 size P&P PCI card or USB2.0 Attachment
RS232:	Data out
Operating temp:	-10°C to 50°C
Storage temp:	-40°C - 60°C
CE compliance	



Ordering Information

The system comes with a camera, a post, a set of 3XNG Schott colored filters (NG4, NG9, NG10) in housing, a PCI card or a USB2.0 Attachment, software on CD disk, carrying case and user manual. Select PC interface when ordering.

	spectral range
BeamOn-VIS (PCI or USB2):	350-1100nm
BeamOn-UV (PCI or USB2):	190-1100nm
BeamOn-IR1310 (PCI or USB2):	350-1310nm
BeamOn-IR1550 (PCI or USB2):	350-1100nm Plus 1550nm±50nm
NG Filter:	1.6mm thick Schott colored filter in mount, select type:4/9/10
BeamOn-Sampler:	Attachment for high power lasers attenuation (up to 20W)



Host Computer Requirements

Pentium III (IV, 1GHz for USB2.0 ver), 128MB RAM, 10MB Free HDD, 16 MB 16 bit color VGA card, resolution 1024X768, CD ROM any type, 1 free 1/3 size PCI slot (or 1 free High Speed USB2.0 port), OS Win2000/XP (also Win98/Me for PCI ver).



System Performance with Software

System Response

VIS 350-1100nm	(*) Model IR1550 is based on the standard CCD for VIS which is coated with a conversion coating, enabling capture of signals at the 1550nm range +/-50nm.
UV 190-1100nm	
IR1310 350-1310nm	
IR1550 350-1100nm and 1550nm	

Max frame rate:	25Hz
Image resolution:	640X480
Shutter speed:	1/50 to 1/10000 sec, 8 steps
Gain control:	6dB to 30dB, 8 steps
Null:	In CW mode Null function is available to automatically subtract background
Optical dynamic range:	up to 1X10 ¹¹ using all filters and software controlled electronic shutter and gain
Damage threshold:	50W/cm ² with filters
Sensitivity:	~5nW/cm ² at 633 nm (models VIS, UV) ~15µW/mm ² at 1310 nm (model IR 1310) ~50µW/mm ² at 1550 nm (model IR 1550)
Saturation:	~1mW/cm ² , no filters (models VIS, UV) ~5mW/cm ² no filters (model IR 1550)

Operation with pulsed lasers:	Ability to capture and replay images from slowly pulsing lasers (1-100Hz) while filtering out frames with no laser pulse. Provision for displaying single shot pulses.
Triggering:	In pulsed mode set threshold by slide bar to display frames with captured pulses
Max frequency for single pulse display:	10KHz



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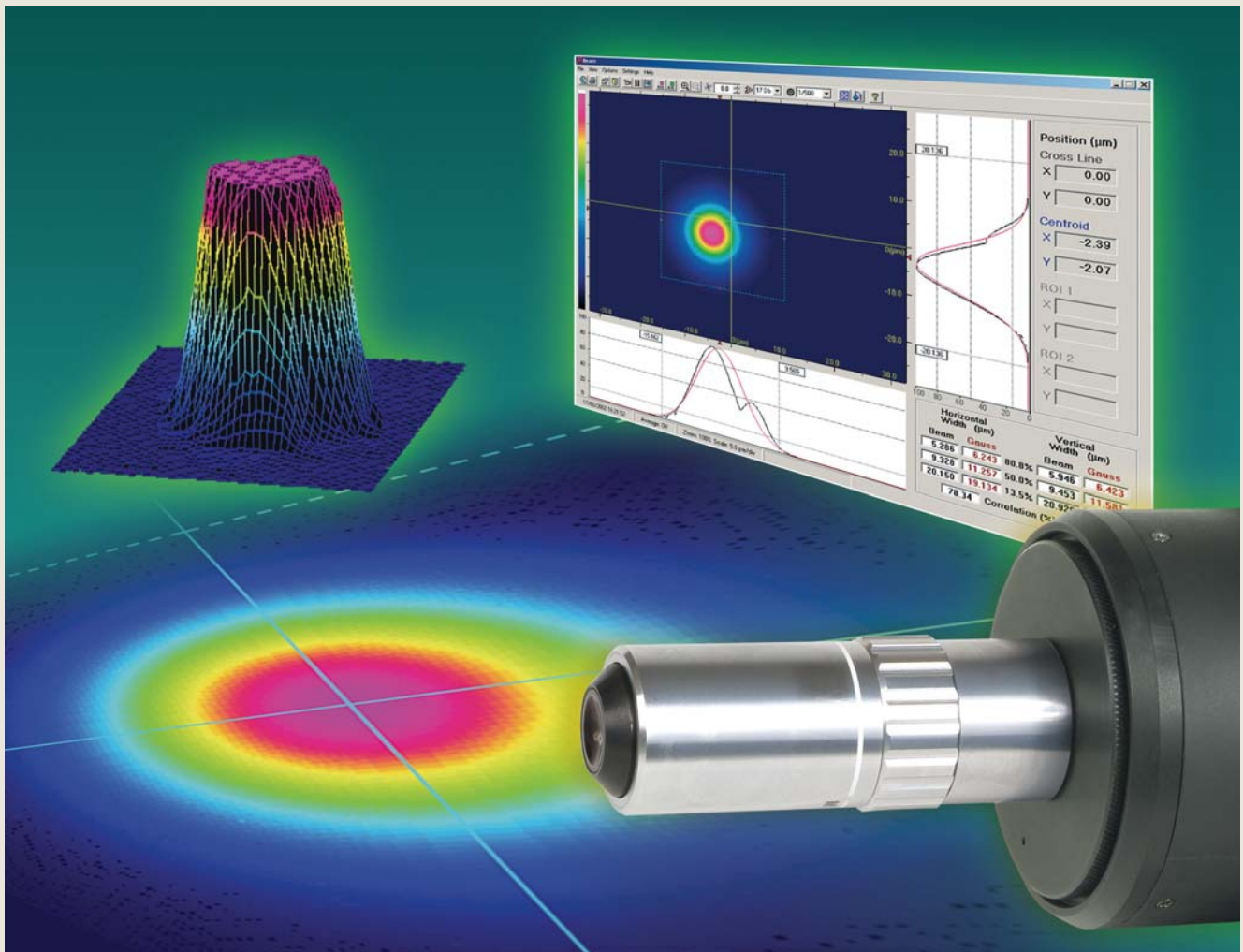
SeongKyeong Photonics

11

info@skphotonics.com

μ Beam

*The Analyzer for
Microscopic beams*



- Measures microscopic beams of less than 0.5 μ m (FWHM)
- Handles CW or pulses at low or high repetition rates
- Measure μ W to Watts with included filter
- Long working distance (Objective to object)
- New! High resolution, high responsivity 800,000 pixel CCD readout device
- Wide spectral response range
- User friendly software
- Full Stand Alone instrument, or USB 2.0 interface with powerful software
- Excellent for industry and laboratory
- Optical zooming for fast beam finding
- Excellent for fast focusing



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Main Software Features

- Graphical presentation of a laser beam in 2D/3D.
- Three ROI's (Region of Interest) user-selectable.
- Centroid and beam width profile calculation to sub micron accuracy.
- User adjustable dynamic range by controlling the built-in electronic shutter speed and gain.
- Performs Test analysis
- Measures CW or pulsed beams.
- Real time beam measurements:
 - Beam size at 3 clip levels with Gaussian fit
 - Total intensity (sum profile) along XY axes
 - XY profiles selectable by anchor point & rotation
- Real time position measurements
- Data logging with detailed statistics
- Video with playback
- Save / View images, snapshot files
- Digital Zooming
- Full on line instructions and help



Specifications

Camera and Magnification

Camera type	CCD 1/6" format, with approx. 800,000 effective pixels
Spectral Response	350 - 1310nm (For IR range, IR corrected objective is required)
Magnification	Infinite conjugate objective and magnifying lens. Objective magnification is x100; x50 ; x20 ; x10 user selectable. Built-in motorized zooming function.

Beam finding feature	Equipped with a zooming lens for observing large areas. Optical dezooming up to 1/25 from objective magnification.
----------------------	--

Attenuation:	Built in NG10 filter (removable)
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Configuration

Tube type zooming microscope equipped with M6 mounting thread.

Dimensions:

163.5mm (L) x 83mm diameter (without objective and base)

Weights:

2.56Kg

Lens Working Distance (W.D.):

6mm (for x100), 13mm (for x50), 20mm (for x20), 33.5mm (for x10), parfocal distance 95mm.

USB 2.0 version:

Stand Alone unit specifications:

USB 2.0 interface, Windows 2000 / XP (Pentium IV 1.6 GHz)
 Pentium III 800MHz and up, 64MB RAM
 2.5" HDD 6GB, Windows 98/Windows 2000
 Color VGA card 1024x768 resolution, 2MB RAM
 One PS2 mouse port, one PS2 keyboard port,
 One LAN Ethernet port ,One serial port with RS232
 One FDD 3.5" ,Two USB ports
 100W power supply, AC input voltage: 90 VAC to 264 VAC
 4 operating buttons on console for fast access to the following functions: Print, Log, Link, Exit
 125(W) x 252(H) x 268 (D) mm
 5.5Kg

Stand Alone unit Dimensions

Stand Alone unit Weights

System Performance with Software:

Minimum measurable beam size	0.5 μ m for x100 objective
Maximum frame rate	30Hz (CW lasers)



Ordering Information

Model uBeam-X- USB 2.0 : A complete system based on a measuring head with USB 2.0 interface and Windows 2000/XP application program, select type of objective magnification (X)

X (Objective magnification): x100, or x50, or x20, or x10

Model uBeam-X-SA : A complete system based on a measuring head and stand alone control unit, select type of objective magnification (X)



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M² Beam

The M² Beam is a versatile multi-function PC based measurement system that provides analytical and graphical capability to measure the 2 axis M² figure of merit, waist size and location of CW lasers. The M² factor is measured in accordance with the proposed ISO standard ISO/CD 11 146. Additionally, the instrument measures the Profile width, Position and Power of the laser beam at intersection points along the beam propagation axis.

Main Applications:

- Laser printers QC
- Far field alignment of lasers
- Optical systems QC
- Construction of Lasers
- Laser Diode module construction
- Particle measurement



Easy Alignment

The instrument is designed to provide three degrees of freedom for aligning the M² Beam to the input beam. Horizontal and vertical axis angles can be adjusted $\pm 1.5^\circ$ relative to the mounting base. These adjustments along with the visual feedback provided by the beam locating software make the system very easy to align.

User Friendly Software

The M² Beam has a special software package for measuring the M² parameter.

Main Functions:

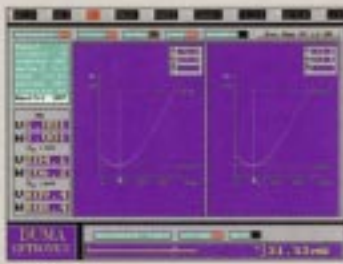
- The first screen presents the relative cross axis location of the beam and the beam waist in orthogonal directions along the direction of propagation, where the locations, M² values and beam sizes are all displayed digitally after completion of the measurement.
- The second screen is a 3D projection of the beam size along the axis of propagation. In either screen, a pointer can be scrolled to a location on the graph and the digital displays will show the values at those points. The software also provides easy file managements capabilities for logging the results for archival purposes.



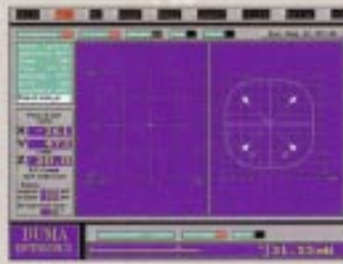
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SeongKyeong Photonics Website: <http://www.duma.co.il> E-mail: sales@duma.co.il info@skphotonics.com

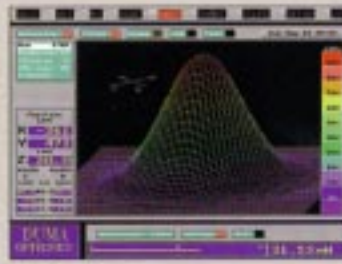
Main Screens



M² - 2D



Position



Projection



Profile

System Specifications

Input Beam:

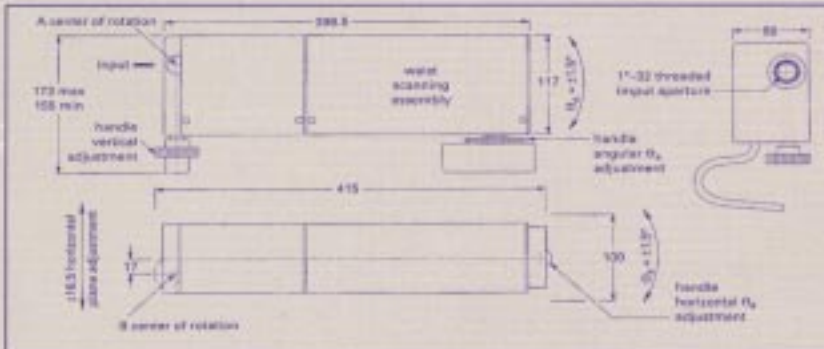
Wavelength Range: 350-1100nm (Si):	800-1800nm (InGaAs)	190-1100nm (UV)
Measurable Power: 100μW-1W	with supplied internal filters (NG4&NG9) for the Si version	
100 μW-5mW	for InGaAs & UV versions	
Beam size:	15mm diameter with lens (Si)	
	7mm diameter without lens (Si)	
	3mm diameter without lens (InGaAs), or 5mm diameter without lens (InGaAs)	

Accuracy

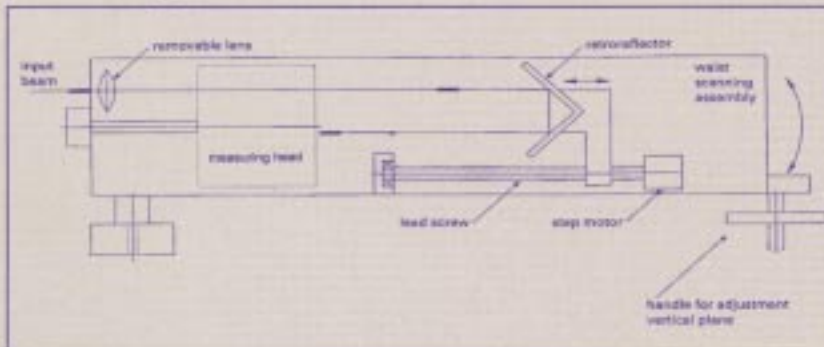
Waist Position as measured at the Transformed Waist:

V Axis: ±50μm	W Axis: ±50μm
Z Axis: ±50μm	M ² Value: ±10%

M² Beam outline and mounting



M² Beam Configuration



Stand Alone unit specification

Construction	Heavy - duty steel
Power supply maximum output	60 Watts AC input voltage: 90 to 264 VAC
Input frequency	47 to 63 Hz
Safety standards	Meets UL, CAS, VDE, FCC standards
FDD	Equipped with one 3.5" FDD 1.44MB
Printer port	Standard Parallel port, 25 Pin (LPT2)
Serial ports	One port for RS232 One port for mouse
Super VGA driver	Super VGA ISA board installed, 1MB

General Information

Construction Material:	Aluminum
Mounting:	M6 or 1/4" screws
Mechanical adjustment:	Horizontal Angle: ±1.5° Vertical Angle: ±1.5°
Operating Temperature:	10°-35°c
Outline dimensions:	100*173*415mm
Cable:	2.5m long

Models

M2-Beam-SI	7-blades profiler, Si
M2-Beam-IR 3mm	7-blades profiler, InGaAs - 3mm diameter
M2-Beam-IR 5mm	7-blades profiler, InGaAs - 5mm diameter
M2-Beam-UV	7-blades profiler, UV-enhanced

FocusGage

FocusGage is a versatile, multi-function PC based measurement system that provides the analytical and graphical power of the 7-blades Beam Profiler, along with the ability to measure the 2 axis depth of focus, waist size, waist location, divergence (NA) of CW lasers and laser diodes. The depth of focus is measured by scanning the laser beam along its propagation axis and measuring beam size at different locations.



Measured Parameters:

- Laser Beam Divergence
- Focus Location
- Numerical Aperture
- Waist Location
- Depth of Focus

Modular Construction

The basic construction of the FocusGage is a 7-blades beam profiler detector head assembly installed into a Waist Scanning Assembly. As shown in the figure - Option A, the Scanning Assembly consists of a corner cube mounted on a stepper motor driven lead screw that effectively translates the waist of the input beam relative to the detection plane of the beam profiler head. A waist location must be generated within the Scanning Assembly for waist measurements. A second option, Option B, where the corner cube is removed, and replaced with a laser projector, enables direct measurements of the examined laser beam. Option A is a perfect solution for direct measurements of lasers and laser systems that can not be fitted into the Waist Scanning Assembly because of the laser size or measurement needs (such as increased scan length). Option B is a perfect solution for direct measurements of bare diodes or mounted laser diode projectors.

Easy Alignment

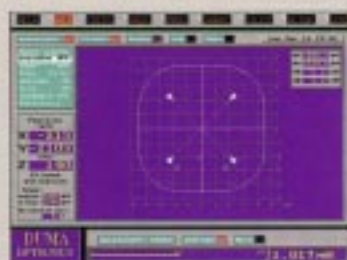
The Waist Scanning Assembly is designed to provide four degrees of freedom for aligning the laser to the input beam. Horizontal and vertical axis angles can be adjusted $\pm 1.5^\circ$ relative to the mounting base. The Horizontal axis plane can be translated $\pm 10\text{mm}$ and the vertical location can be adjusted $\pm 3\text{mm}$ relative to the mounting base.



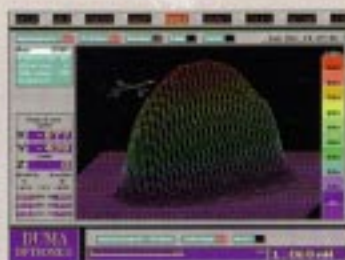
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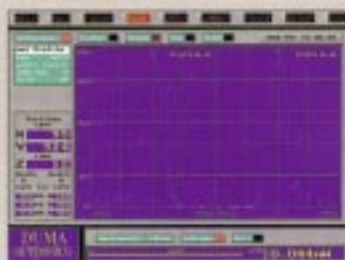
Main Screens



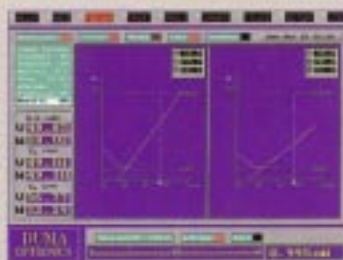
Adjust



3D



Profile



Focus

System Specifications

Input Beam:

Wavelength Range: 350-1100nm (Si) or 800-1800nm (InGaAs) or 190-1100nm (UV)
 Measurable Power: 10μW-1W(*) (*with supplied ND filters for the Si version)
 10μW-5mW For InGaAs & UV versions
 Maximal Beam size:
 Si & UV: 9mm diameter, 12.7mm for elliptical beams
 InGaAs: 3mm diameter, or 5mm diameter

Scan Parameters for the corner cube (Option A):

Minimum distance from Input Aperture to measuring area: 230mm
 Minimum Step Size: 100μm
 Selectable Profile Locations: 0-140 Scan length: 280mm

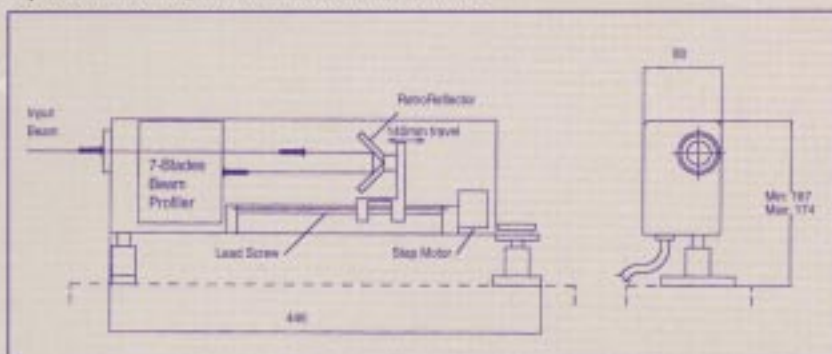
Scan Parameters for direct coupling (Option B):

Length of scan: 140mm Waist position: ±50μm
 All axes resolution: down to 1%

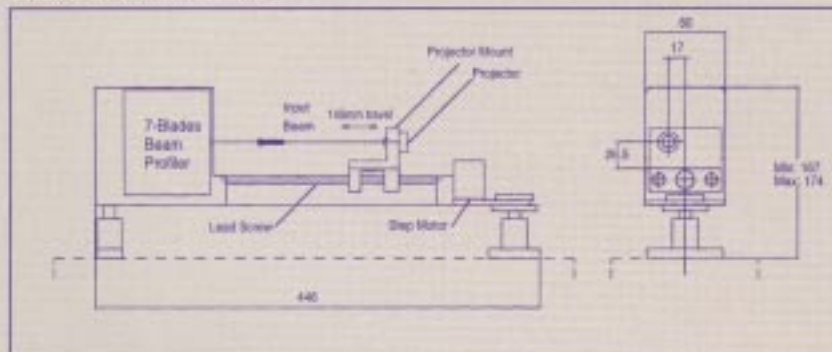
Accuracy

Depth of focus accuracy: ±50μm Resolution down to 10μm

Option A: Moving Retro-Reflector, fixed source



Option B: Moving source



Stand Alone unit specification

Construction	Heavy - duty steel
Power supply maximum output	60 Watts AC input voltage: 90 to 264 VAC
Input frequency	47 to 63 Hz
Safety standards	Meets UL, CAS, VDE, FCC standards
FDD	Equipped with one 3.5" FDD 1.44MB
Printer port	Standard Parallel port, 25 Pin (LPT2)
Serial ports	One port for RS232, One port for mouse
Super VGA driver	Super VGA ISA board installed, 1MB

General Information

Construction Material:	Aluminum
Mounting:	M6 or 1/4" screws
Mechanical adjustment:	Horizontal Angle: ±1.5° Vertical Angle: ±1.5°
Scanning Assy dimensions:	100x173x415mm, 2.5kg
SA unit dimensions:	248x122x215mm, 4.5kg
Cable:	2.5m long, 0.5kg

Models

FG-Si: FocusGage Si version
 FG-InGaAs - 3mm: FocusGage InGaAs 3mm
 FG-InGaAs - 5mm: FocusGage InGaAs 5 mm
 FG-UV: FocusGage UV-enhanced version

* All models can be supplied with either option A or option B configurations.

FiberAnalyzer

Goniometric Radiometer
for fiber/diode analysis



FiberAnalyzer is a characterization instrument for the angular radiation intensity of light. The device provides real-time far-field measurements over a 60° angular field.

Features

- Measures Numerical Aperture
- Measures Angular width ratio
- Measures Angular position with respect to the optical axis
- Measures power

Main Applications

- Fiber optic far-field angular radiation
- Laser diode/Led far-field angular radiation
- Collimation measurements
- Coupling of energy into fiber



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Specifications

Spectral response	300-1100nm or 800-1800nm
Detector type	Si or InGaAs
Connector type	Receptacles to various fiber optic connectors and adaptors for laser diodes
Measuring range	60° ($\pm 30^\circ$)
Angle accuracy	$\pm 1\%$
Spatial Resolution	$\pm 0.05^\circ$
Scan unit weight	2.5kg
Scan unit dimensions	229x147x85mm

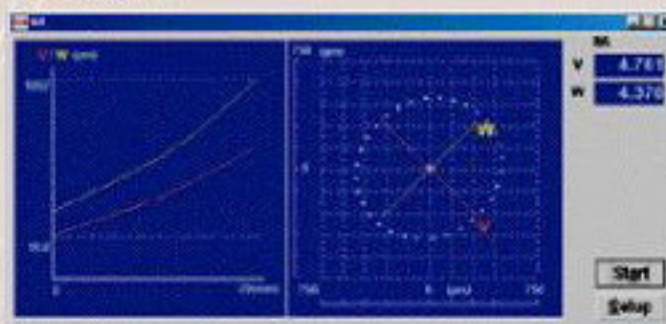
Software Features

Power



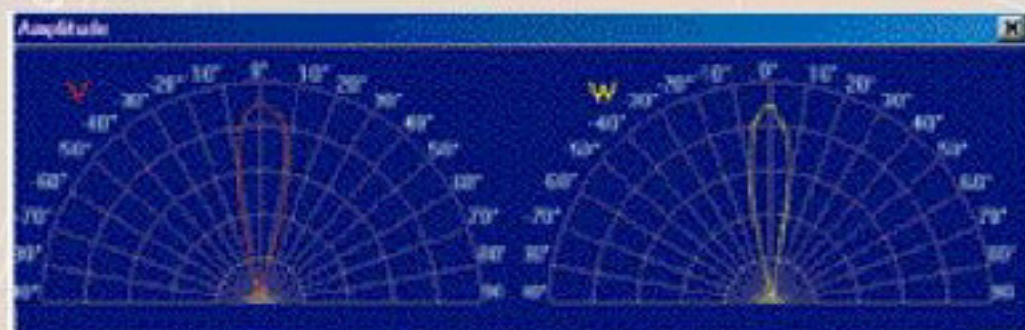
Real time power measurement

NA Measurement



Real-time N.A. measurement and monitoring of angular position in two axes

Goniometer



Real-time display of angular propagation in two axes

Ordering Information

Complete System containing: Stand alone operating console, scan unit, attachments for fiber optic or laser diode, software package installed on console unit.

FyberAlyzer - InGaAs: System based on InGaAs detector

FyberAlyzer-Si: System based on Si detector



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NEW

BeamOn Long-bow

Features

- Measures laser beams from remote
- Measures large or small beams from remote
- Measures UV beams through a conversion plate
- Handles CW or pulsed beams
- High resolution built-in calibration function
- Motorized zooming function for best beam capture
- AutoFocus function

Applications

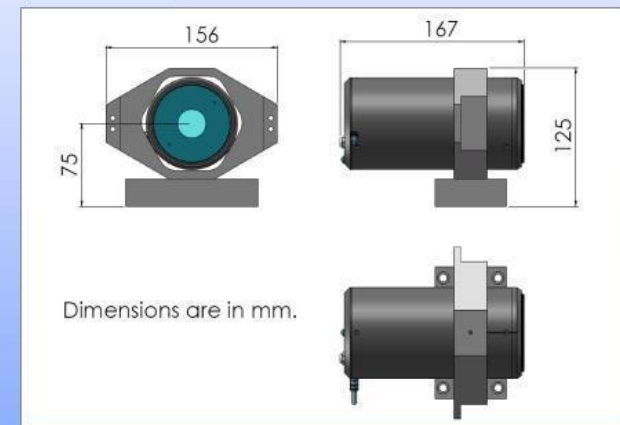
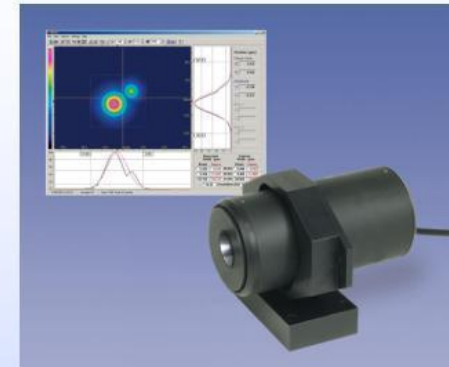
- Measures general light beams like: solar beams projected from remote
- General beam profiler for projected laser beam measurements
- Measurement of UV beam through wavelength conversion
- Measurement of beam wondering

Specifications

- 1/6" type CCD with about 800K effective pixels
- Spectral range 350 – 1310nm
- Zoom ratio X25 optical, X2 digital
- Electronic shutter 1/3 – 1/10000 sec
- Gain: software controllable
- USB2.0 interface
- Electronic shutter controllable by computer
- Angle of view 45° wide-end to 2° tele-end
- Minimum working distance 800mm tele-end
- Signal to noise ratio 50 dB
- Frame rate 25 Hz
- Filters included: 3 optical filters 1/8, 1 ND filter 1/400

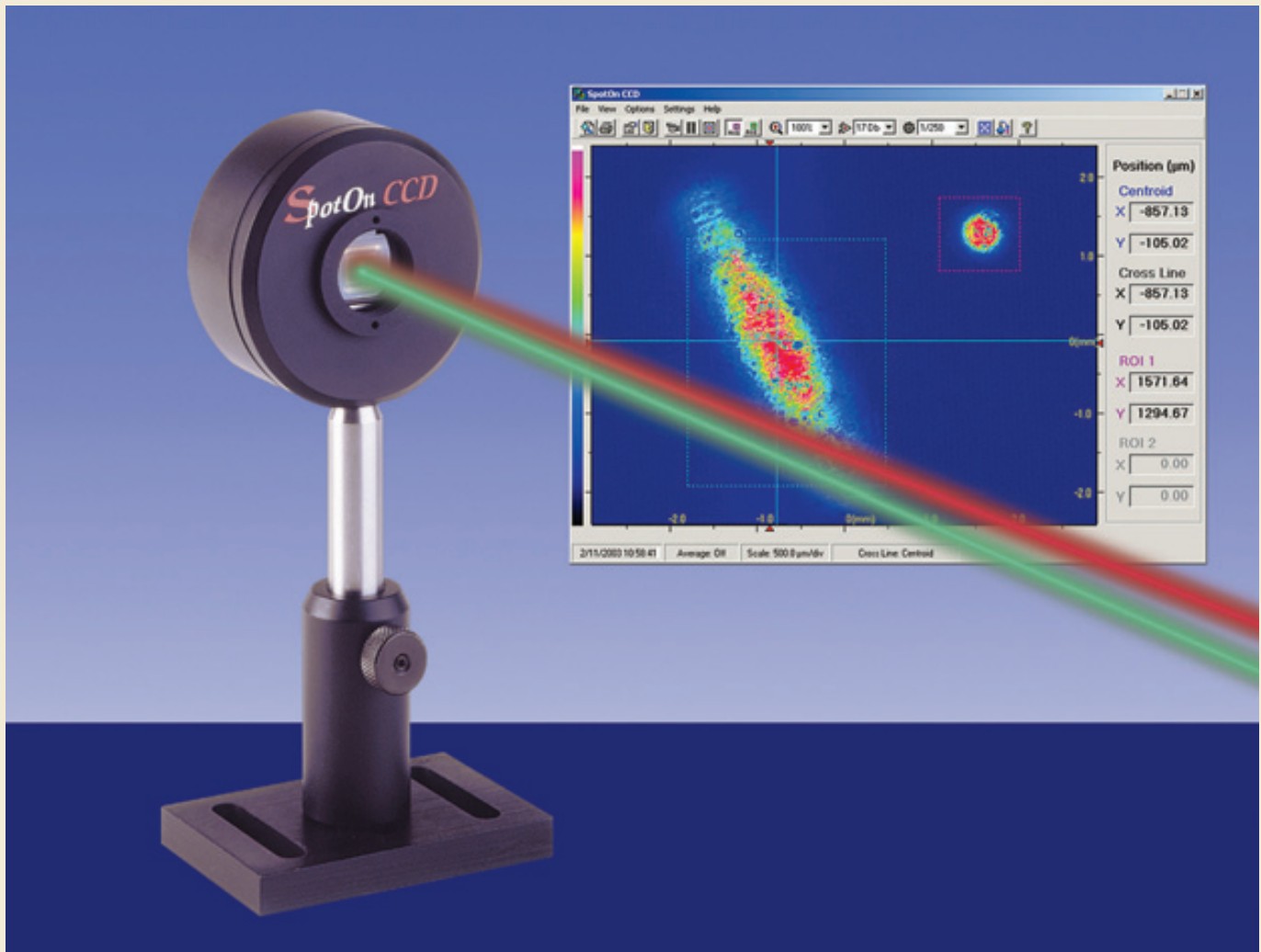
Software features

- Real time beam measurements: beam size at 3 clip levels with Gaussian fit
- Real time 2D/3D beam image display
- Real time position measurements
- Data logging with detailed statistics
- Video with playback
- Save & View images, snapshot files
- Digital zooming
- Performa Test analysis
- Measures CW or pulsed beams



SpotOn CCD

Optical Beam Position Measurement System



Expanding your positioning capabilities

- **Versatile:** Measures beam position (up to 3 beams simultaneously) over a wide dynamic range. Measures both CW and pulsed beams.
- **Precise:** High accuracy measurement less than 5 µm deviation edge-to-edge and sub-micron resolution for minute movements.
- **Flexible:** A wide spectral response, from deep UV (190 nm), VIS range and up to 1550 nm.
- **Convenient:** Plug-in capture card, no interrupt, no DMA required for installation, or USB video device.
- **Easy to use:** User-friendly software using mouse/keyboard control, complete on-line help routine.

Main Software Features

- 3 Regions of interest for simultaneous measurements of up to 3 beams.
- Centroid calculation and display.
- 2D contour map of beam in real time.
- Data exporting to another computer via RS232.
- Data logging and detailed statistics.
- Software controlled electronic shutter.
- Average.
- Multiple PCI boards operation (Win2000/XP).



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Applications

- Measure laser centration or displacement.
- Align laser beams and QC of fiber optics.
- Calibrate surface flatness and machine tool alignment.
- Monitor vibration, deflection and motion.



System Specifications

Camera type	CCD 1/2" format, 4.6x6.2mm sensitive area.
Spectral response	VIS: 350-1100nm , UV:190-1100nm, IR:1310nm or 1550nm
Position resolution	sub - micron range.
Position accuracy	5 μ m deviation edge-to-edge.

CW Lasers

Dynamic Range	The filter combinations together with the built-in shutter control allow a range of beam attenuations of about $1 \times 10^8:1$
Shutter speed	1/50s to 1/10,000s
Max frame rate	30 Hz

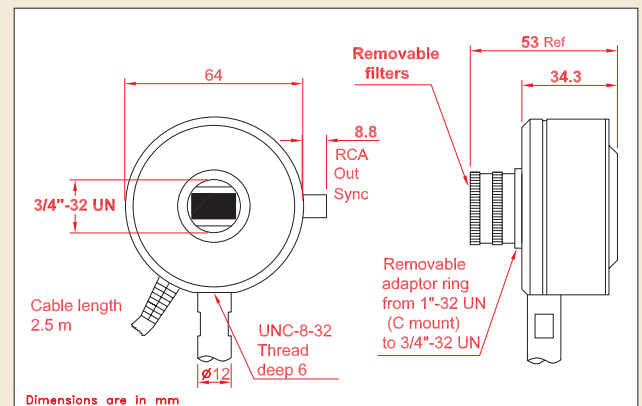
Pulsed Lasers

Handling of pulses	Ability to capture pictures from slowly pulsing lasers. (1-100 Hz) while filtering out frames with no laser pulse.
Trigger	Automatically set by system.
Threshold	Null function to automatically subtract background and set trigger level.

Max frequency for single pulse display:10 KHz

Dimensions

Camera	ϕ 63mm dia. x 53mm deep with filters. 2 -1mm thick ND filters in housing about 240:1(wavelength dependent). 8-32 threaded mounting hole. Female RCA connector-Sync out
Cable	2.5m cable to 8 pin mini DIN type, attached to camera.
Card	1/3 size PCI P&P, or USB attachment.



Hardware Requirements

The recommended host computer requirements are:
Pentium III, 128 MB RAM
2MB 16bit color VGA card
One free 1/3 size PCI slot, or USB port
OS: Windows 95/98/ME/NT 4.0/2000/XP for PCI card,
Windows 98/ME/2000/XP for USB attachment.



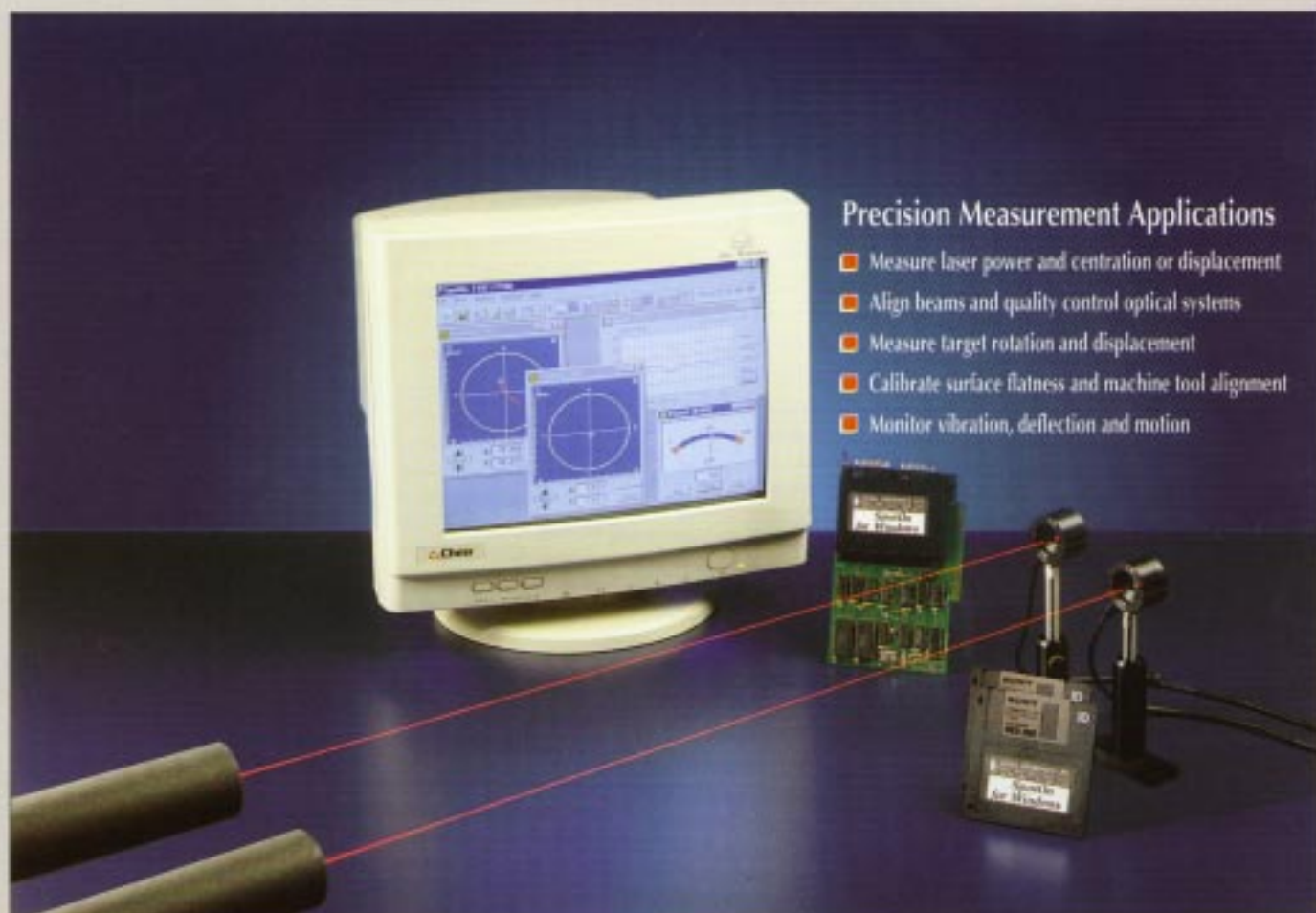
Ordering Information

The system comes with a camera, a set of 2 x NG10 filters in housing, PCI card or USB attachment. software on CD disk, carrying case and user manual. Select card /USB attachment when ordering.

SPOTCCD-VIS	camera for VIS range 350-1100 nm
SPOTCCD-UV	camera for UV range 190-1100 nm
SPOTCCD-IR 1310	camera for IR range 1310 nm
SPOTCCD-IR 1550	camera for IR range 1550 nm

SpotOn

Optical Beam Position and Power Measurement System For Windows



Precision Measurement Applications

- Measure laser power and centration or displacement
- Align beams and quality control optical systems
- Measure target rotation and displacement
- Calibrate surface flatness and machine tool alignment
- Monitor vibration, deflection and motion

Sophisticated Cost-Effective System

- **Versatile:** Measures both Beam Position (over area up to 8 mm diameter) and power (from 10 μ W to 10 mW).
- **Precise:** Available with Quadrant detector (1 μ m position accuracy, down to 0.1 μ m position resolution) or dual-axis Lateral Effect detector (50 μ m position accuracy, 3 μ m position resolution).
- **Convenient:** Plug-in card, detector and software work with any PC under windows operating system.
- **Easy to use:** User-friendly software using mouse/keyboard control, complete on-line help routine.

NEW

A new hardware & software configuration enables *simultaneous operation of either One or Two PSD's* using one plug-in card and one software package!

NEW

DLL Drivers for user-defined applications based on SpotOn hardware!



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Precision Optical Beam Position sensing

Choice of Lateral Effect or 4-Quadrant detectors

Precision linearization of position in software

Large area silicon Position Sensitive Detectors (PSD's) detect and record the position of an incident light beam. There are two types of detectors used for sensing the position of the centroid of the beam in X-Y plane orthogonal to the beam: the **4-Quadrant detector** and the **dual-axis Lateral Effect detector**.



The 4-Quadrant detector is a combination of 4 independent detectors separated by 30 μ m wide gaps across their surface (10 μ m gaps optional). A symmetric laser centered on the detector will generate equal photo-currents from each of the four sectors. If the beam moves from the center of the detector the currents from the four sectors will change and the processing algorithm will give the X and Y displacements relative to the center, which is known very accurately.

Thus the major utility of the quadrant sensor is in systems where a beam must be aligned or centered to an optical-axis ("nulled") or where it is necessary to monitor and measure small displacements over long periods with high stability.



The dual-axis Lateral Effect detector uses a doped disc of silicon with four electrodes connected equidistant around the perimeter. Photocurrents processed by the algorithm give displacement values in X and Y directions respectively (in μ m).

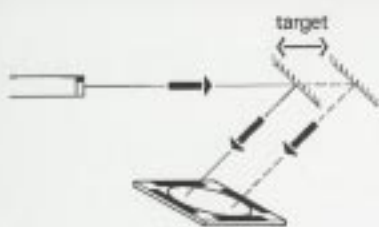
The algorithm is software controlled and calibration corrections stored in memory are used to linearize the response and obtain a precision calibration across the entire detector surface.

This linearization feature implies that unlike the 4-Quadrant detector, the dual-axis Lateral Effect detector can be used to measure the position of a beam over its entire surface.

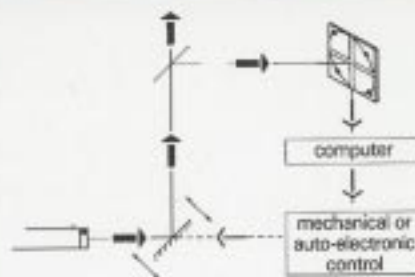
Applications in Optics and Metrology

There is rapid expansion in the application of PSD systems in the fields of position, motion and distance measurement; optical system alignment; machine tool calibration; vibration and deformation analysis.

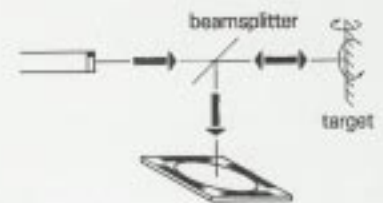
Illustrated below are six typical basic techniques, which can be modified to suit particular OEM requirements.



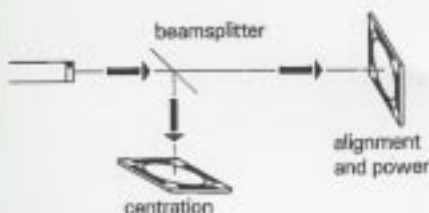
Measure Target Linear Displacement. Use a collimating lens if the target reflection is diffuse, not specular



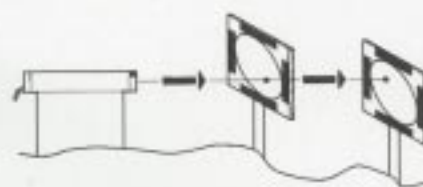
Control Optical Beam Alignment. Both mechanical and auto-electronic systems (using the RS232 port) can be developed to achieve beam-ruling and cantiration



Measure Target Rotation. This "autocollimator" method can be used to measure small angular changes and misalignments and is distance independent



Monitor Laser Power, Cantiration and Alignment. Detectors in both the near-field and far-field are used to characterize the laser



Measure Surface Uniformity. Such a PSD-based metrology system can be used to test surface fitness, straightness, squareness and parallelism etc.

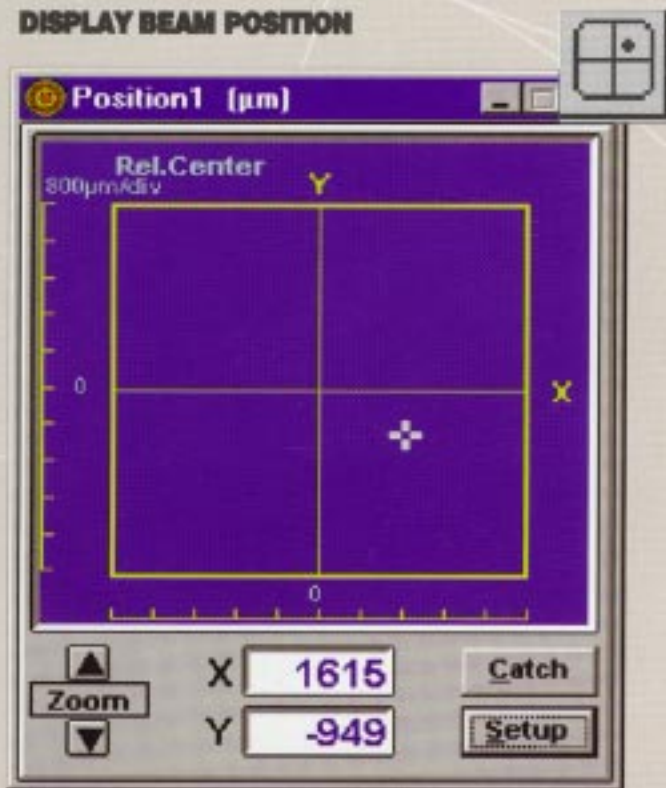


Analyze Target Vibration and Deflection. Use a collimated laser diode or LED attached to the target under investigation to optically generate position information at the PSD

Powerful Position and Power Measuring System

The following presentations can be activated simultaneously, for either one or two PSD's being connected to the system:

DISPLAY BEAM POSITION



DISPLAY BEAM POSITION (x and y) of either a 4-Quadrant or a Lateral-Effect position detector. Relative center can be set for relative position measurements, zooming on displayed target, alarm setting and more!

DISPLAY POWER



DISPLAY POWER with analog and digital displays. Possible operations include: Change measuring units, load a pre-defined filter file, perform ambient-light suppression.

More features, including:

- * Extended printing capabilities
- * Transmission via RS 232 link protocol to another PC computer
- * Configure setup screens and save for future sessions.
- * Log data files at chosen intervals for a chosen period of time.

CHART

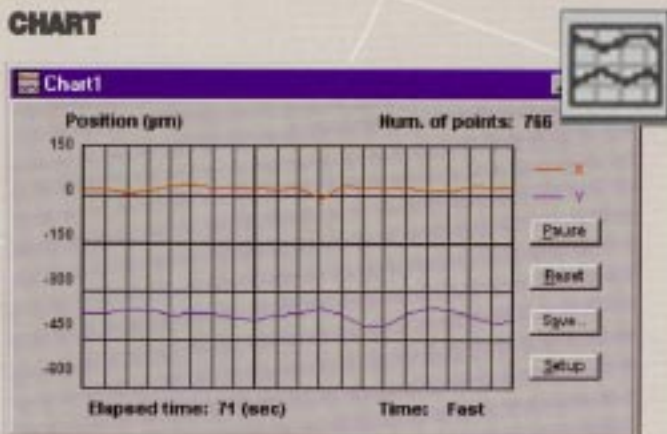
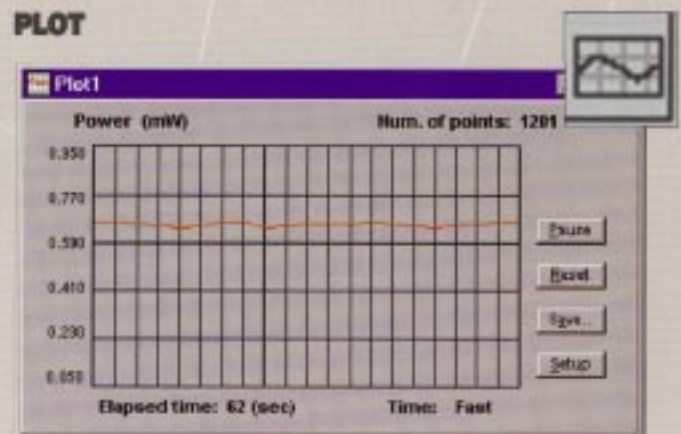


CHART function is used to display changes in the position (x and y) with time, with autoscaling and saving capabilities.

PLOT



PLOT function is used to display changes in the power with time, with autoscaling and saving capabilities.

Host Computer Requirements

IBM-PC 486 (or Pentium), 8MB RAM, 4MB free on HDD
Windows 3.11, Windows 95, Windows NT 4.0 (Work station)
Standard ISA BUS and space for a half-size expansion slot
One FDD (3.5") 1.44MB
VGA Screen, 1MB 256 color
Keyboard/mouse operated

Measurement specifications —

	4-Quadrant Detector	Lateral Effect Detector
Photodetector	10mm X 10mm silicon 4 sectors separated by 30µm gap Optional: Separated by 10µm gap	10mm X 10mm dual axis silicon 8mm calibrated diameter
Usable Beam size range	50µm < diameter < 8mm	
Position Measurement range	4mm diameter circle maximum centered on the detector center The beam must overlap all 4 sectors	8 mm diameter circle maximum centered on the detector center
Position Resolution	Better than 0.5µm	Better than ±1µm
Position accuracy	±1µm or ±0.25% of beam diameter whichever is greater	±50µm over 8mm diameter calibrated area (software linearization)
Operational Spectral range:	350-1100nm	
Power Range: (*)	10µW to 10mW	
Power Accuracy: (*)	±5%	

* To maintain the full calibration accuracy, attenuating optical ("neutral-density") filters may be necessary for operation with beams greater than 1mW. Saturating "non-linear" effects depend on the beam size, type and wavelength, but caution should be exercised when using the quadrant detector above 3-6mW or the lateral effect detector above 1-3mW.

Dimensions —

Sensor Head: 38mm diameter, 25.5mm long, M4 tapped post-mounting hole, aligned to detector axes to <±0.5°, Optical aperture threaded 1"-32 TPI ("C") for mounting filters

Cable: 3m long, attached to sensor head

Plug-in card: Standard AT ISA, 165mm long, 2x9 pin D-Type connectors

Weights: Sensor Head: 175g with cable, Computer plug-in card: 160g

Environmental: Operating Temperature Range: 0° to +35°C

Ordering Information —

Complete system, including sensor head/s with attached cable/s, computer plug-in card, control software on 2x3.5" diskettes, user-manual. C-mount transmission filter (about 25%) is optional (DFILT001)

SpotOn Single types:

One Quadrant detector system (30 µm gap)
One Quadrant detector system (10 µm gap)
One Lateral Effect detector system (10x10mm)

DQUAD01
DQUAD02
DLAT001

SpotOn Duplex types:

Two Quadrant detectors system (30 µm gap)
Two Lateral Effect detectors system (10x10mm)
One Lateral Effect detector & One Quadrant detector system (30 µm gap)
Two Quadrant detectors system (10 µm gap)
One Lateral Effect detector & One Quadrant detector system (10 µm gap)

SPOTQQ
SPOTLL
SPOTLQ
SPOTUU
SPOTLU

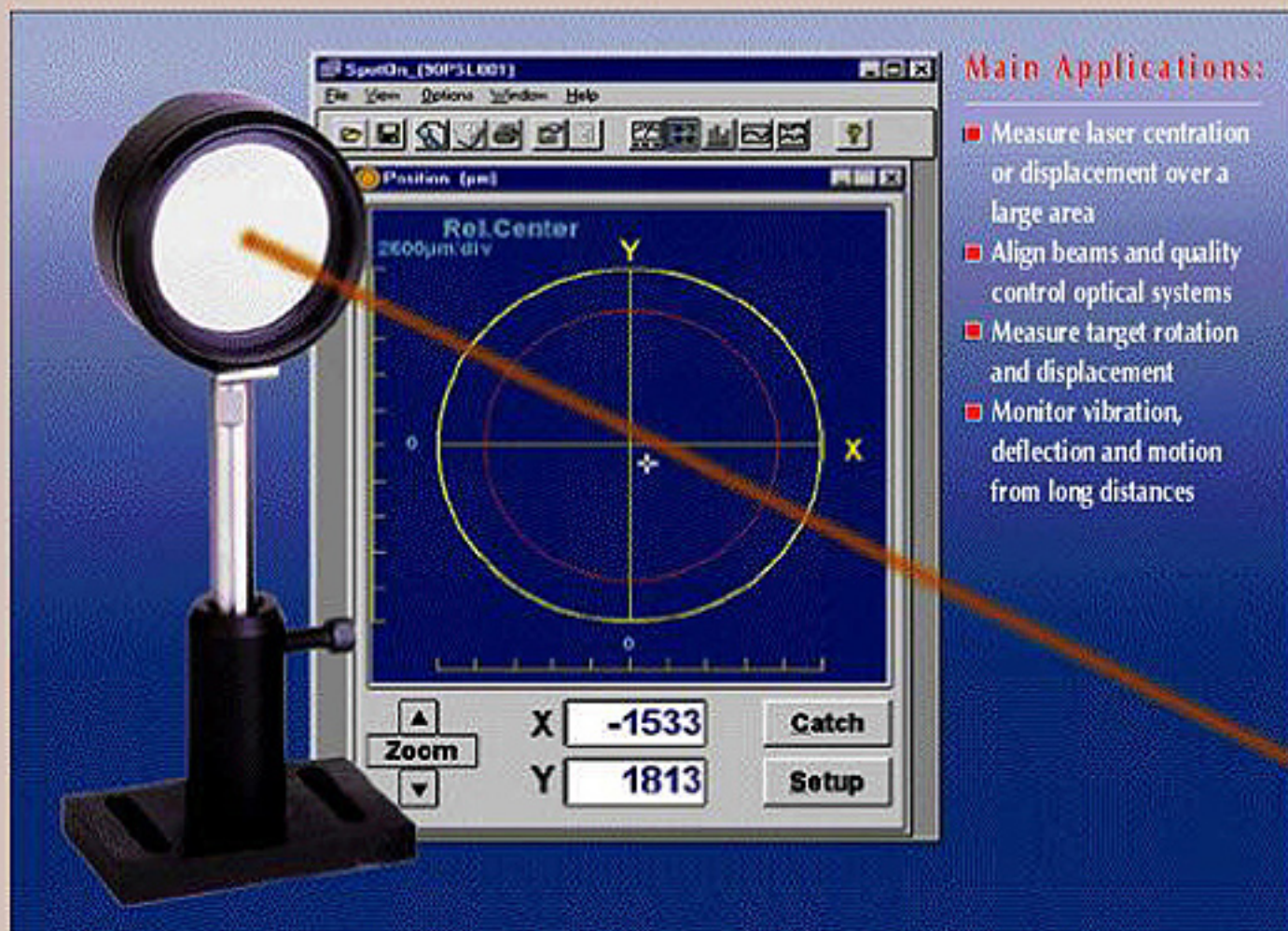


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SpotOn

Optical Beam Position and
Power Measurement System
DUM SPOT L-44 Version



A perfect solution for beam positioning over a large detection area

- **Versatile:** Measures both Position (over area up to ± 12.5 mm diameter) and power (from 10 μ W to 1 mW).
- **Precise:** Large area detection with 3 μ m position resolution, 0.5% typical position accuracy, absolute maximum error 1.5%
- **Convenient:** Compact system operating with any Notebook/Desktop under Windows. Available with ISA, PCI or PCMCIA cards.
- **Easy to use:** User friendly software using mouse/keyboard control, complete on-line help.
- **More Features:** Simultaneous operation of either one or two detector heads
 - DLL drivers for integration with user-defined applications
 - Built-in cut-off red filter and protective hood



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Measurement specifications

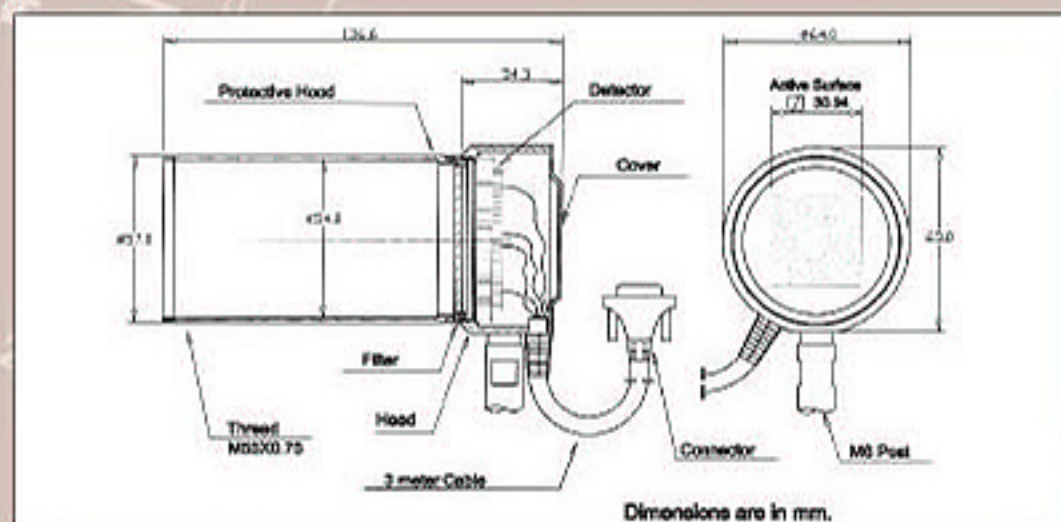
Use one or two PSD's at a time.

Photodetector	Dual axis silicon Lateral Effect L44 (see dimensions in drawing)
Usable Beam size range	50 μ m < diameter < 25mm
Position Measurement range	$\varnothing$ 25mm circle maximum centered on the detector center
Position Resolution	Better than $\pm 3\mu$ m
Position accuracy: (*)	0.5% typical, 1.5% absolute maximum error
Operational Spectral range:	350-1100nm
Power Range: (**)	10 μ W to 1mW
Power Accuracy	$\pm 5\%$
Plug in board type	1/3 size PCI board / 1/3 size ISA board / PCMCIA type II
Weights	Sensor head 450 gram with cable
Environmental	Operating temperature range 0° to +35°c

Note(*): To maintain the full calibration position accuracy a cut-off transmission filter is placed inside a protective hood assembled on the measuring head, transmission range at cut-off of about 600nm.

Note(**): Position measurement in the range of 1mW-10mW is feasible although performance can be slightly deteriorated

Dum Spot L44 Head Drawing



Hardware Requirements

CPU: Pentium or higher
RAM: 32MB
FDD: 3.5" 1.44MB
HDD: 30MB free

Operating System: Windows 9X/NT4.0/Me/2000(*)
VGA: 1MB 256 color
Card socket: 1*PCMCIA type II + 5V, or 1/3 size PCI slot, or 1/3 size ISA slot.
(*) The PCMCIA ver does not run on NT 4.0

Ordering Information

Complete system including: plug-in card, manifold box, PnP L44 measuring head with attached cable, post, Protective hood and cut-off filter, software on 4x3.5" diskettes, carrying case, user manual

DUM SPOT L44-PCI Complete system based on a PCI card
DUM SPOT L44-ISA Complete system based on an ISA card
DUM SPOT L44-PCMCIA Complete system based on a PCMCIA card

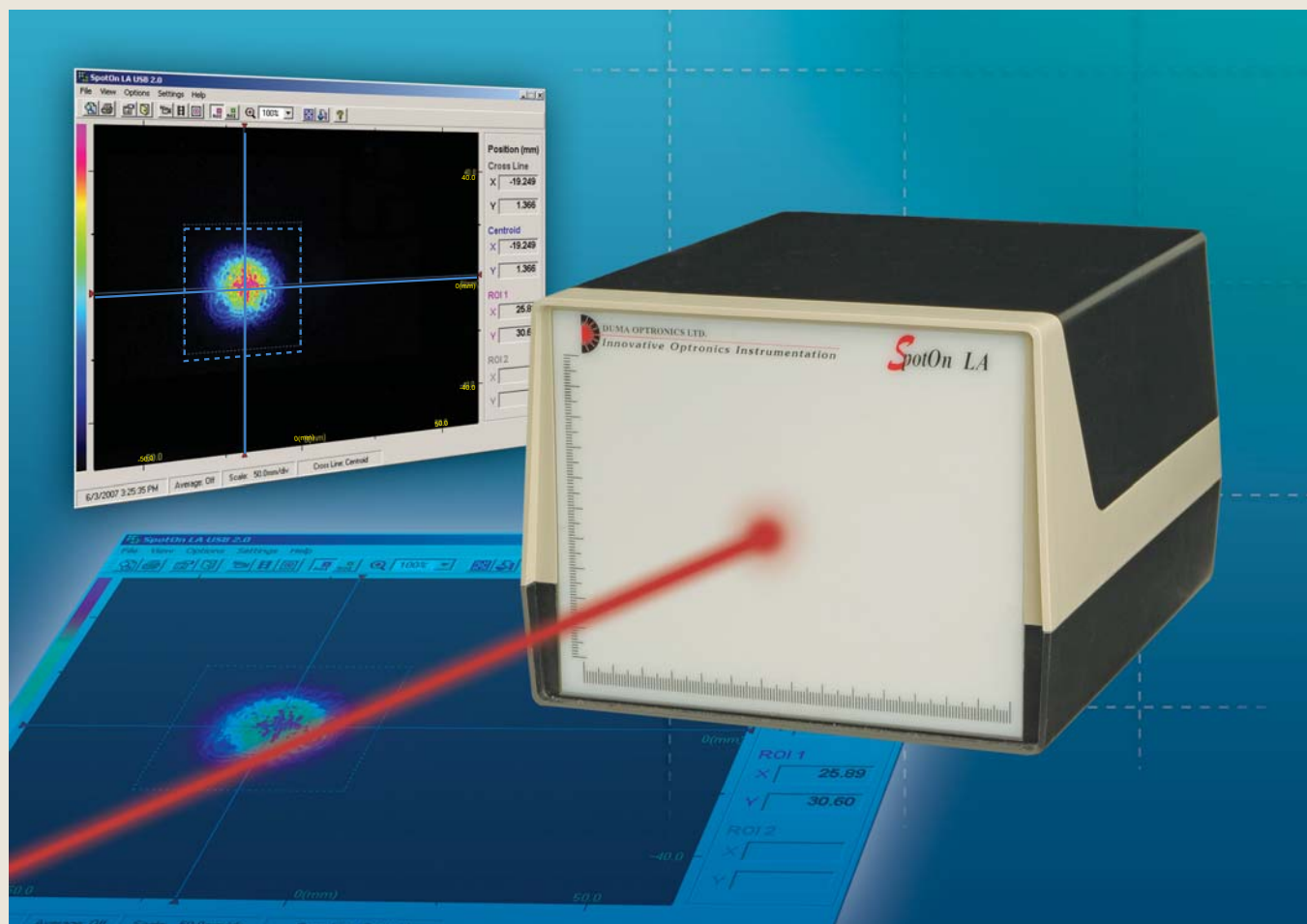


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SpotOn LA

Large Aperture Beam Positioning System



Featuring Large Optical Aperture

Applications

- Measure position deviations over long distances
- Monitoring low frequencies displacements, including buildings and bridges
- Fence polls alignment
- Track straightness

Main Features

- **Large Aperture** - For long distance or large movement alignment
- **Extremely accurate** - Less than 1% edge-to-edge and 30 μ m resolution for minute movements
- **Versatile** - Measures beam position (up to 3 beams simultaneously), measures both CW and pulsed beams
- **Easy to use** - User friendly software with on-line Help routine, P&P camera with USB2.0 interface



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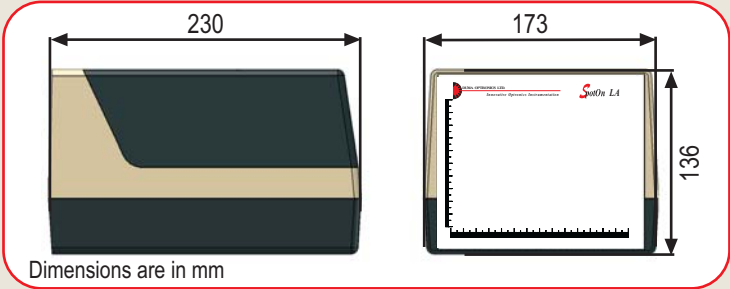
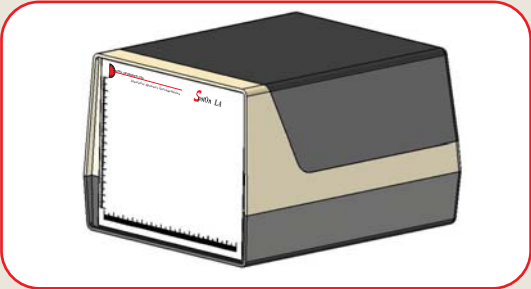
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Specifications

Detection size	X=140mm, Y=103mm
Dimensions	230mm(L)x173mm(H)x136mm(W)
Weight	810 gr
Frame rate	30 Hz
Spectral response	400 – 800 nm
Position accuracy	Less than 1% Edge-to-edge
Position resolution	30 µm
Interface	High Speed USB2.0
Cable	1.8m USB2.0 cable attached to camera
Power	Powered by USB port
Input power level	About 2.5mW at 650nm (consult factory about attenuation)

Mechanical drawing



Software Features

- Centroid calculation and display
- 3 regions of interest for simultaneous measurements of up to 3 beams
- 2D contour map of beam in real time
- Direct data logging to Excel files with detailed statistics
- Data exporting to another computer via RS232
- Average
- Automatic Pass/Fail analysis report
- ActiveX package to control software from your application



Hardware Requirements

The recommended host computer requirements are:
Pentium IV, 2GHz, 512 MB RAM, 100 MB HDD free, Windows XP/Vista, 64MB 16 Bit color VGA card,
1 free high speed USB2.0 port, CD ROM drive



Ordering Information

SPOTON-LA – System comprises of a Plug & Play camera with USB2.0 interface and attached cable, software on CD disk.



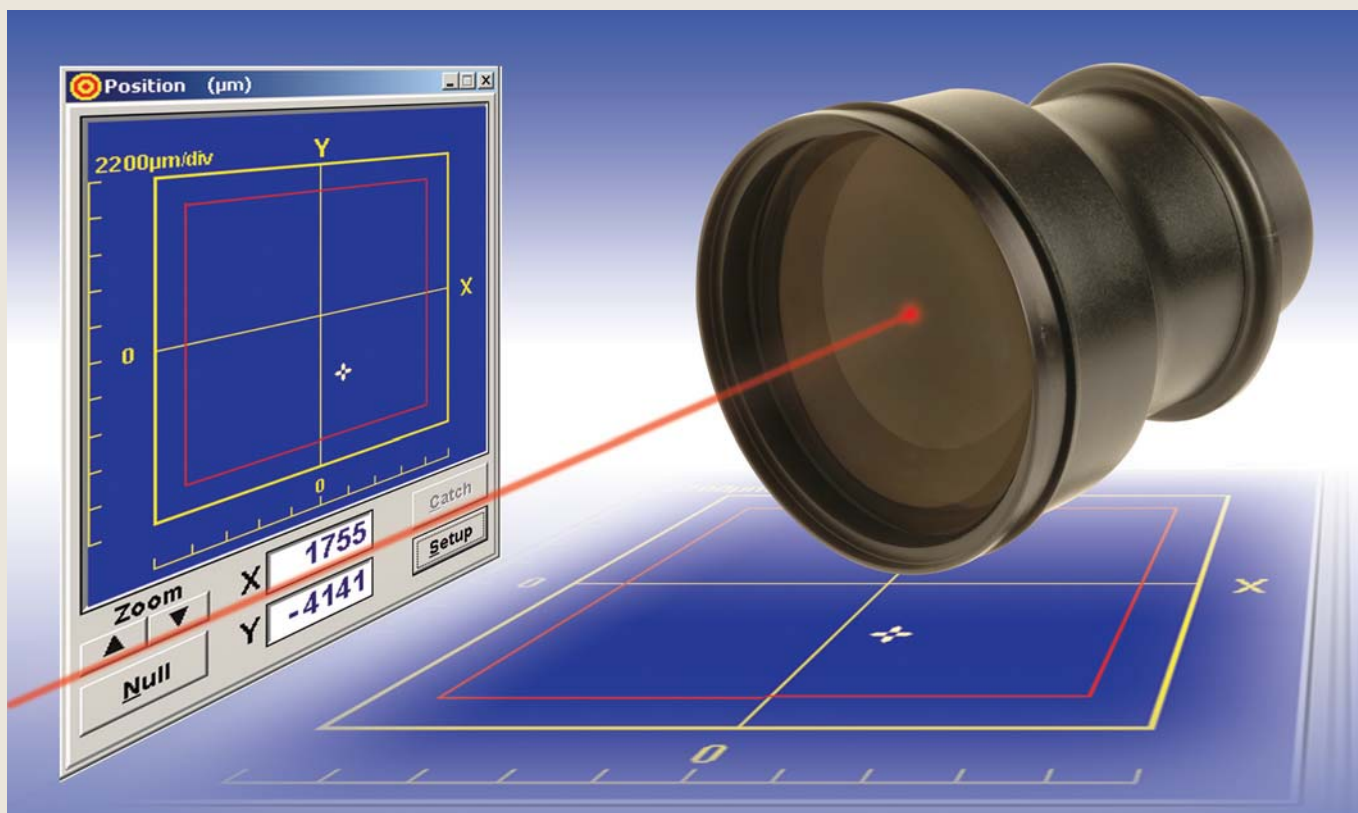
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SpotOn

*Optical Beam Position and
Power Measurement System*

E X T E N D E D R A N G E



Novel design for wide measurement range

Specifications

Photodetector	Dual Lateral Effect
Mesuring Range	20mm x 20mm (built in optical expander)
Max beam size	22mm diameter
Position resolution	+/-3μm typical
Position accuracy	Better than 1%
Dimensions	81mm long X 68.5mm diameter
Thread	UNC-1/4" X20 (or M6) for post
Weight	Sensor head with 3m long cable 320 Gr
ND filters	To be front mounted, available ND type and bandpass filters Contact factory for details

Ordering information

Model:	ER
Operational with the following systems:	
- SpotOn PCI	(SPOTPCI-ER)
- SpotOn PCMCIA	(SPOTPC-ER)
- SpotOn Analog	(SPOTANA-ER)
- SpotOn Analog USB	(SPOTANAUSB-ER)



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SpotOn

Optical Beam Position and Power Measurement System

Stand Alone Version

In the effort to provide better solutions for measuring the position and total power of laser beams for places with limited room, we have developed the Stand-Alone SpotOn system, using either Lateral Effect or 4-Quadrant detectors.



Features:

The system consists of a measuring head with an attached cable and a rugged small footprint instrument which is perfect for environments like a factory floor, areas where shock and vibrations are common and too harsh for a commercial PC, and where simplified mode of operation is required.

The instrument measures and displays:

- Beam Position X,Y (μm), either absolute or relative measurements.
- Beam power at a selected wavelength

Applications in Optics & Metrology:

- Pointing stability of laser beams
- Optical beam alignment
- Testing beam-delivery systems
- Monitor laser power & centration

- An external VGA screen can be connected to the unit for full graphics presentation of the SpotOn software.
- The unit is equipped with a 3.5" FDD enabling data saving, or loading user defined filter transmission files.
- The unit is capable of printing measured data and transmitting data via RS232 to another computer.



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Measurement Specification

Specification	Quadrant Detector	Lateral Effect Detector
Photodetector	10mm * 10mm silicon 4 sectors separated by 30 μ m gap (optional 10 μ m gap)	10 mm * 10 mm dual axis silicon 8 mm calibrated-diameter
Position resolution:	Better than 0.5 μ m	Better than $\pm 1 \mu$ m
Position accuracy:	$\pm 1 \mu$ m or $\pm 0.25\%$ of beam diameter whichever is greater	$\pm 50 \mu$ m over 8mm diameter calibrated area (Software linearization)
Spectral range:	350 nm to 1100 nm	
Usable beam size range:	50 μ m < diameter < 8mm	
Measurable beam power range(*):	10 μ W to 10mW	
Power accuracy(*):	$\pm 5\%$	
Measurement update rate:	20 Hz	

(*) To maintain the full calibration accuracy, attenuating optical ("neutral-density") filters may be necessary for operation with beams greater than 1mW. Saturating "non-linear" effects depend on beam size, type and wavelength, but caution should be exercised when using the quadrant detector above 3-6mW or the lateral effect detector above 1-3mW.

Stand alone unit specifications

Construction:	Heavy-duty steel
Power supply maximum output:	60 Watts AC input voltage: 90 VAC to 264 VAC
Input frequency:	47 to 63 Hz
Safety standards:	Meets UL, CAS, VDE standards
EMI standards:	Meets FCC standards, CE mark
Vibration (operating):	5 Hz to 15Hz, 0.24" peak to peak, 15 to 500Hz, 2.5G peak to peak.

Dimensions

Detector Head:	Dimension: 38mm diameter, 20mm long, M4-tapped post mounting hole, aligned to detector axes to $< \pm 0.5^\circ$, optical aperture threaded 1"-32 TPI ("C") for mounting filters. Weight: 175g with cable
Cable:	3m long attached to head
Stand Alone unit:	Operating: 0° to $+35^\circ$ c Storage: -10° to $+45^\circ$ c
Temperature:	248mm * 122mm * 215mm, weight: 4.5Kg

Ordering Information

Complete system, including sensor head with an attached cable and compact measuring Stand Alone unit. The SpotOn Stand Alone is provided in three versions:

Quadrant detector system (30 μ m gap)	DQUAD01-SA
Quadrant detector system (10 μ m gap)	DQUAD02-SA
Dual-axis Lateral Effect detector system	DLAT001-SA

Additional C-mount Optical ND filters are available. Other detectors such as 5 x 5mm / 25 x 25mm dual-axis silicon Lateral Effect detectors are available by special order.

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SpotOn

Optical Beam Position and Power Measurement System

Dual PSD's Stand Alone

Main Applications:

- Measure laser power and centration or displacement
- Align beams and quality control optical systems
- Measure target rotation and displacement
- Calibrate surface flatness and machine tool alignment
- Monitor vibration, deflection and motion



A perfect solution for simultaneous position measurements of two PSD's

The rugged small footprint instrument is perfect for environments like a factory floor, areas where shock and vibration are common and too harsh for a commercial PC, and where simplified mode of operation is required.

The instrument measures and displays:

- **Beam position** X, Y (μm or %) for both sensor heads, either absolute or relative measurements
- **Beam power** at a selected wavelength
- **Versatile:** Measures both Beam Position (over area up to 8 mm diameter) and power (from 10 μW to 10 mW).
- **Precise:** Available with Quadrant detector (1 μm position accuracy, down to 0.1 μm position resolution) or dual-axis Lateral Effect detector (50 μm position accuracy, 3 μm position resolution).
- Save data files on the built-in 3.5" FDD for further analysis
- Data transmission via RS232 link to another computer



DUMA OPTRONICS LTD.

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Seongkyeong Photonics

Measurement specifications

	4-Quadrant Detector	Lateral Effect Detector
Photodetector	10mm X 10mm silicon 4 sectors separated by 30µm gap (Optional:10µm gap separation)	10mm X 10mm dual axis silicon 8mm calibrated diameter
Usable Beam size range	50µm < diameter < 8mm	
Position Measurement range	4mm diameter circle maximum centered on the detector center The beam must overlap all 4 sectors	8 mm diameter circle maximum centered on the detector center
Position Resolution	Better than 0.5µm	Better than ±1µm
Position accuracy	±1µm or ±0.25% of beam diameter whichever is greater	±50µm over 8mm diameter calibrated area (software linearization)
Operational Spectral range:	350-1100nm	
Power Range: (*)	10µW to 10mW	
Power Accuracy: (*)	±5%	
Measurement update rate:	20Hz	

* To maintain the full calibration accuracy, attenuating optical ("neutral-density") filters may be necessary for operation with beams greater than 1mW. Saturating "non-linear" effects depend on the beam size, type and wavelength, but caution should be exercised when using the quadrant detector above 3-6mW or the lateral effect detector above 1-3mW.

Stand Alone unit specifications

Construction:	Heavy-duty steel
Power supply maximum output:	60 Watts AC input voltage: 90 VAC to 264 VAC
Input frequency:	47 to 63 Hz
EMI standards:	Meets FCC standards, CE mark, Meets UL standards
Vibration (operating):	5Hz to 15Hz, 0.24" peak to peak, 15 to 500Hz, 2.5G peak to peak
Display:	1/4 VGA Mono LCD, resolution 320x240 dots/picture
FDD:	The unit is equipped with one 3.5" FDD 1.44MB

Dimensions

Sensor Heads:	38mm diameter, 25.5mm long, M4 tapped post-mounting hole, aligned to detector axes to <±0.5°, Optical aperture threaded 1"-32 TPI ("C") for mounting filters
Cable:	3m long, attached to sensor head
Stand Alone unit:	248mm x 122mm x 215mm
Weights:	Sensor Head: 175g with cable, Stand Alone unit: 4.5kg
Environmental:	Operating Temperature Range: 0° to +35°C

Ordering Information

SPOTQQ-SA Quadrant system with 2x30µm gap detectors
SPOTUU-SA Quadrant system with 2x10µm gap detectors
SPOTLL-SA Lateral Effect system with two 10x10mm dual axis Lateral Effect detectors
SPOTLQ-SA One Quadrant 30µm gap detector and one Lateral Effect detector system
SPOTLU-SA One Quadrant 10µm gap detector and one Lateral Effect detector system
Optionals: C-mount optical ND filters. Other detectors are available by special order.

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AlignMeter

Simultaneous measurements of position and angular displacements, using position sensing detectors.

The system performs simultaneous measurements of centration (in μm), angular deviations (in mrad) of the beam with respect to the outer housing or tube, as well as absolute power.

Main applications in optics and metrology

- Alignment of articulated robotic beam delivery systems
- Alignment of lasers and laser tubes
- Examining errors in slideways
- Overall testing of laser beam parameters: Power, centration, alignment and long-term stability.
- Alignment of laser systems for wafer inspection.



PC version



PCMCIA version

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► Specifications

Photodetector (Default)	10*10mm dual axis silicon Lateral Effect 8mm calibrated diameter (*) Other detector sizes are available on a special-order basis!
Usable beam size range	50µm < diameter < 8 mm
Position measurement range	8 mm diameter circle maximum centered on the detector
Position resolution	Better than ±1µm (with average on)
Position accuracy	±50 µm over 8mm diameter calibrated area (software linearization)
Angle measurement range	8 mm / Focal length (*) or 80 mrad in standard configuration
Angle resolution	±1 µm / focal length (*) or .01 mrad in standard configuration
Angle accuracy	±50 µm / focal length (*) or .5 mrad in standard configuration
Operational spectral range	300 - 1100 nm
Calibrated spectral range	350 - 1050 nm
Power range (**)	10 µW - 10 mW at the detector plane
Power accuracy (**)	±5% at the detector plane
Data update rate	5 Hz for software control of two PSD's
Environmental	Operating temperature range: 0° - 35°C
ND Filters	Optional per special order



(*) Focal length for the standard configuration is f=100mm.

(**) To maintain full calibration accuracy, attenuating optical filters (ND) may be necessary for operation with beams greater than 1 mW per detector (the total of 2-2.5 mW per assembly head). Saturating "non-linear" effects depend on the beam size, type and wavelength.

► Host Computer Requirements

PC version: IBM-PC 486 DX4 (or pentium), 16 MB RAM, 4MB free on HDD, Windows 95 or Windows 3.11, one FDD 3.5", VGA screen, keyboard / mouse.

PCMCIA version: IBM-PC 486 DX4 (or pentium) desktop computers equipped with a PCMCIA drive (or notebooks or laptop computers) 16 MB RAM, 4MB free on HDD, Windows 95, one FDD 3.5", VGA screen, keyboard / mouse.

► Ordering Information

ALIGNLL: 0.5 size PC ISA-bus board, software on 2x3.5" disks, beam splitter assembly including: beam splitter 50/50 A/R coated, lens, lens tube, 2 x Lateral Effect detector heads assembled to the beamsplitter assembly.

ALIGNPC: PCMCIA card, manifold box which plugs into the PCMCIA card, having 2 x 9-pin sockets for sensor heads connectors, software on 2 x 3.5" disks, beam splitter assembly (Same as for model ALIGNLL)

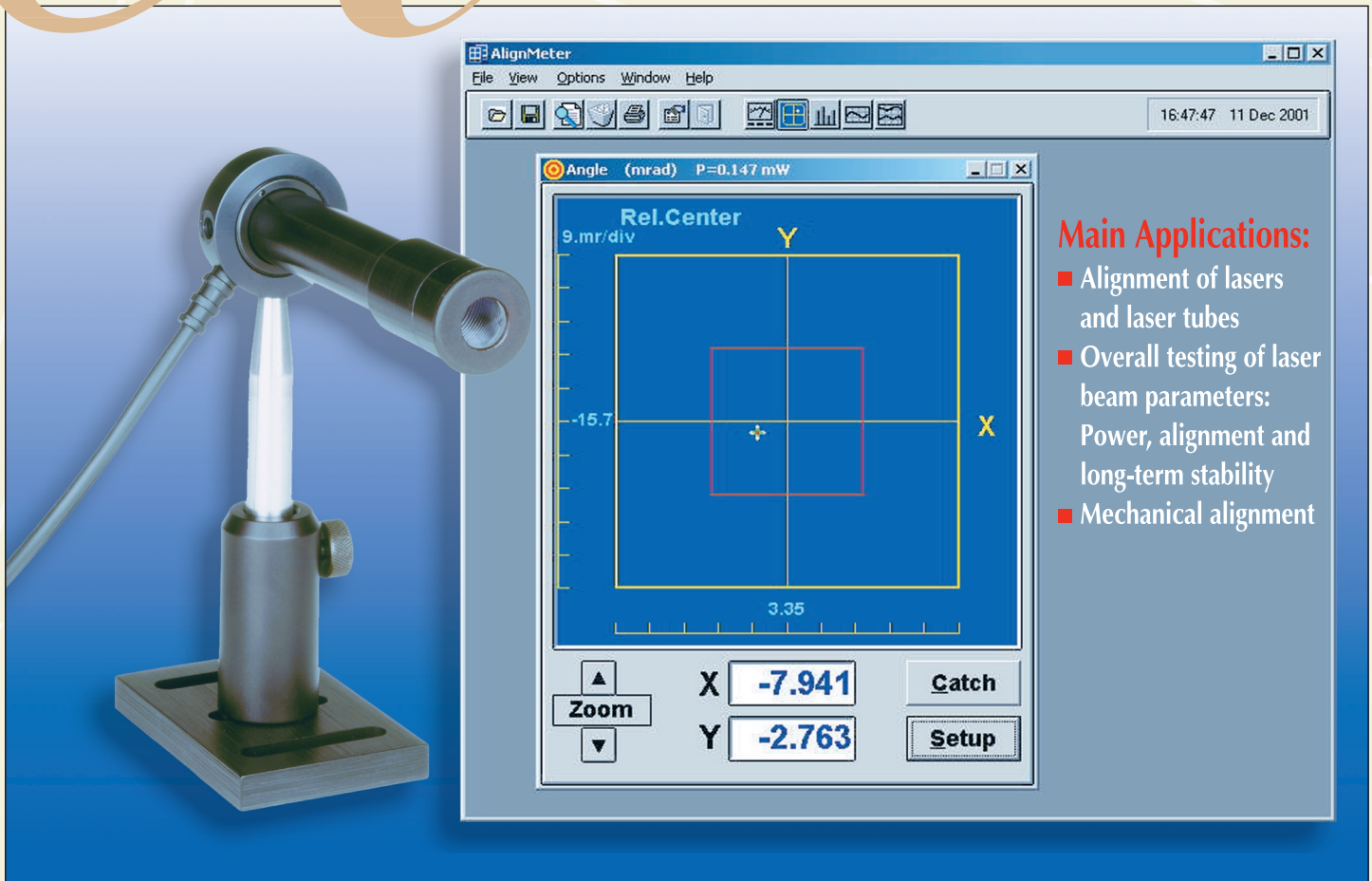


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AngleMeter

Simultaneous measurements of power and angular displacements, using position sensing detectors.



A compact and powerful solution for laser angular deviations measurements

■ **Versatile:**

Measures both beam angular deviation (in mRad) over a 90mRad usable range, and power over a range of 10 μ W to 10mW.

■ **Precise:**

Based on a dual-axis Lateral Effect detector coupled to a high precision lens. Angle resolution better than 10 μ Rad, accuracy ± 0.25 mRad from edge to edge

More Features:

- Analog version for high-speed applications up to 30KHz
- Simultaneous operation of either one or two detector heads
- DLL drivers for integration with user defined applications (32 bit)

■ **Convenient:**

Compact system operating with any notebook/desktop computer under Windows, available with ISA/PCI/PCMCIA cards.

■ **Easy to use:**

User friendly software, easy installation, on-line help routine.



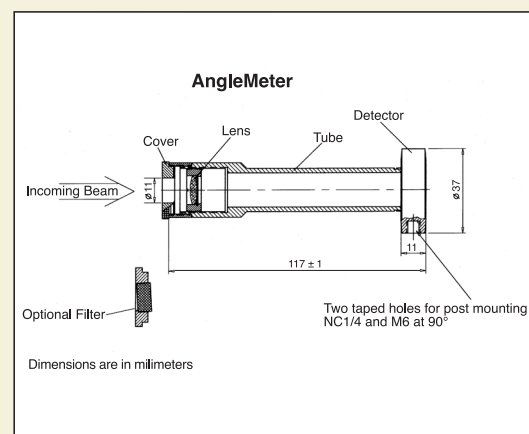
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Specifications

Photodetector(*)	Default 9mmX9mm dual axis silicon Lateral Effect, 8mm calibrated diameter
Usable measurement range	90mRad
Lens focal length	100mm
Angle resolution	Better than 10 μ Rad
Angle accuracy over the entire measurement range	± 0.25 mRad
Operational spectral range	300-1100 nm
Calibrated spectral range	350-1100 nm
Power range	10 μ W - 10 mW at the detector plane
Power accuracy (**)	$\pm 5\%$ at the detector plane
Data update rate (***)	Digital 35 Hz for single head, 17 Hz for dual head Analog 30KHz max speed; see SpotOn Analog for more details
Environmental	Operating temperature range: 0° - 35°C
Weight	Sensor head with lens tube and cable 190gr
ND Filters	Optional per special order



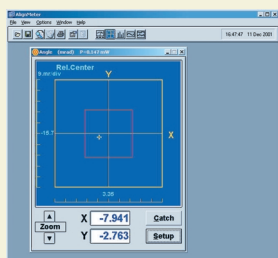
(*) Other detector sizes are available on a special order basis, including 4mmX4mm, 18mmX18mm, as well as other input apertures.

(**) To maintain full calibration accuracy, attenuating optical filters (ND) may be necessary for operation with beams greater than 1 mW per detector head. Saturating "non-linear" effects depend on the beam size, type and wavelength.

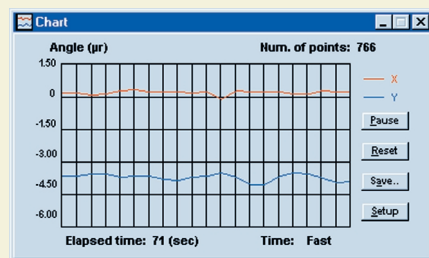
(***) Data update rate depends on computer resources, other application programs operating in parallel, etc.



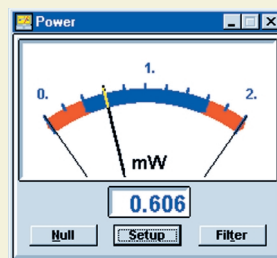
Main Screen Presentations



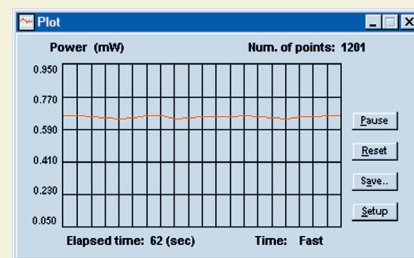
Angle



Chart



Power



Plot



Host Computer Requirements

CPU: Pentium II or higher

RAM: 32MB

FDD: 3.5" 1.44MB

HDD: 30MB

Operating system: Windows 9X/NT 4.0/ME/2000(*)

VGA: 1MB 256 color

CD Drive: One CD drive X 8

Card Socket: 1XPCMCIA type II +5V, or 1/3 size PCI slot, or 1/3 size ISA slot

* The PCMCIA version does not run on Windows NT 4.0



Ordering Information

Complete system composed of: a plug-in card (ISA/PCI/PCMCIA), a manifold box for connection of detector/s, PnP detector head assembly (PSD plus lens and lens tube) attached to 3m long cable, software package for Windows, carrying case, user manual.

Angle-ISA: Complete system based on ISA card

Angle-PCI: Complete system based on PCI card

Angle-PCMCIA: Complete system based on PCMCIA card

Angle-ANALOG: Complete system based on analog electronics, AngleMeter measuring head attached to 3m long cable

Accessories: A variety of ND filters in Housing (M22X0.5): NG4, NG9, or NG10



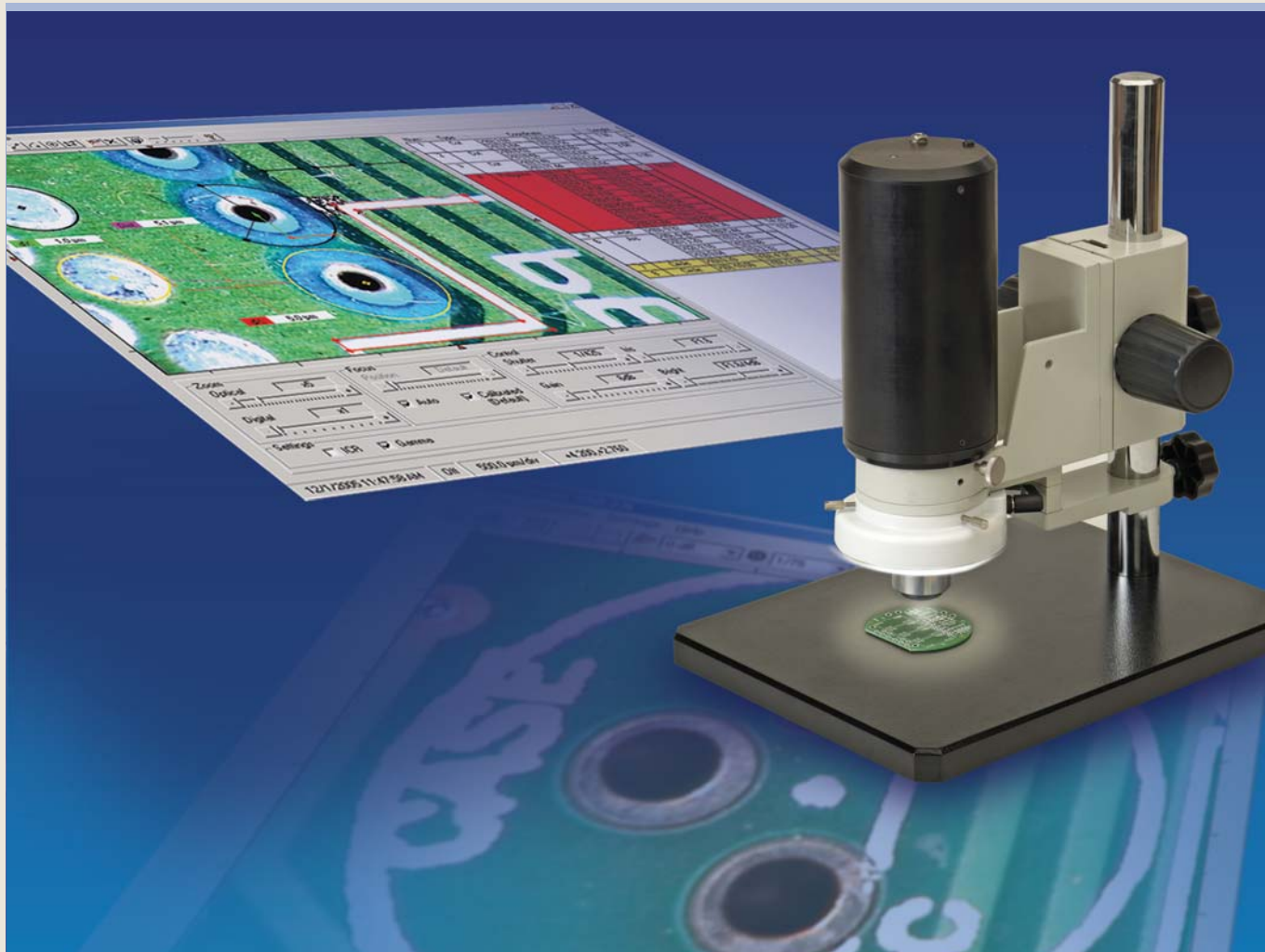
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μ VideoScope

Video Microscope Measurement on your PC



- Performs calibrated measurements of magnified images
- Resolution down to 0.3 μ m
- Video zooming X25 Optical, or X10 Digital
- High-resolution CCD detector (Approx. 800,000 pixels)
- Measures: Distances, Circles, Hole-to-Hole distances, Angles, Polygons, Tolerances
- Long working distance
- Exchangeable objectives
- Full USB2.0 interface with powerful user-friendly software
- Full hardware image-control including AutoFocus function
- Low light capability in B&W mode
- Software-edge enhancement



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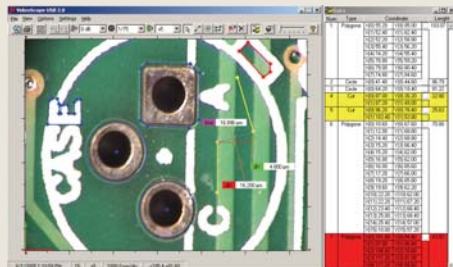
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Performance

- Software support of various magnifications
- Full measuring built-in tools
- User adjustable dynamic range and camera parameters
- Full archiving data-base
- Graphical presentation of images



Objective	N.A. mm	W.D. mm	f mm	R μm	Optical ZoomX1 Work Area (μm)	Optical ZoomX25 Work Area (μm)
X2	0.055	34	100	5		
X5	0.27	40	50	2	17500	1158
X10	0.28	33.5	20	1	5000	450
X20	0.42	20	10	0.7	2300	230
X50	0.55	13	4	0.5	673	92
X100	0.7	6	2	0.4	268	45

Main Hardware Features

- X25 Optical zooming
- 800,000 effective pixels CCD
- Large magnification
- Full hardware control of shutter speed, optical shutter, image parameters,
- Gamma control, motorized mechanical shutter
- Auto and Manual Focus over a limited travel

Specifications

Camera type	CCD 1/6" format, with approx. 800,000 effective pixels
Spectral response	350-1100nm
Magnification	Infinite conjugate objective and imaging lens. Objective magnification is X2, X5, X10, X20, X50, X100 user selectable. Built in motorized zooming function
Zooming	Motorized, Optical X25, Digital X10
Max frame rate	30Hz
Lens Working Distance	(W.D.) 6mm (for X100), 13mm (for X50), 20mm (for X20), 33.5mm (for X10), 40mm (for X5) 34mm (for X2), parfocal distance 95mm
Interface	USB2.0 version
Dimensions	163.5mm (L) x 83mm diameter (without objective and base) 370mm (H) x 200mm (L) x 270mm (W) with stand
Weight	4.5Kg with stand

Computer Requirements

Pentium 1.7GHz Centrino, 256MB RAM min, color VGA card 1024X768 resolution with 8MB RAM, one CD ROM, HDD with 10MB free space, one PS2 mouse port, one PS2 keyboard port, one High Speed USB2.0 port, Windows 2000/XP

Ordering Information

μVScope-X :	Complete system based on a measuring head with USB2.0 interface and Windows 2000/XP application program. Select type of objective magnification (X)
X(Objective magnification) :	x100, or x50, or x20, or x10, or x5, or x2
Stand :	Stand with LED illumination
μVSoft :	Software package for image analysis (for Windows 2000/XP platforms)

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NEW

Low Light Dual Mode Camera

Features

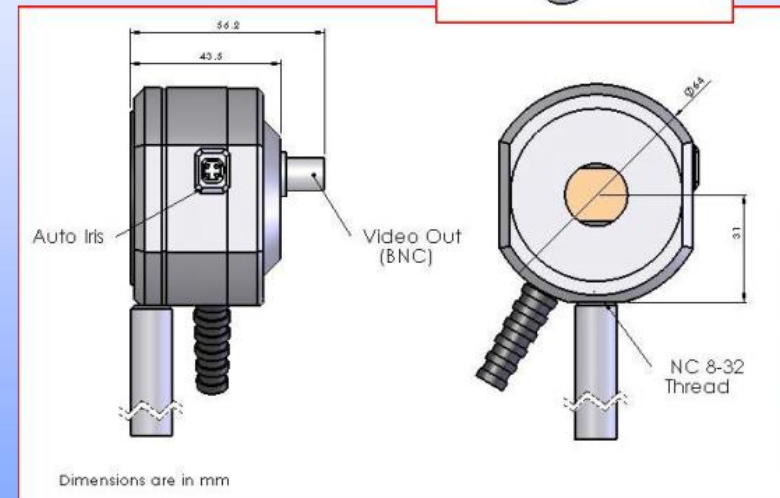
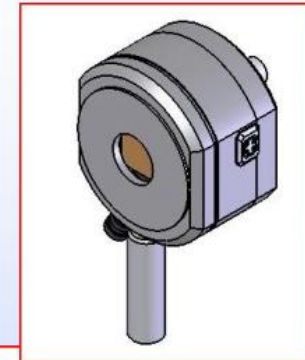
- Extremely low light level – 0.0001 Lx, F 1.4
- Auto – iris lens
- USB 2.0 interface to computer, parallel analog video out
- SN ratio – exceeding 50 dB
- Gain, Shutter, Gamma – computer controlled

Applications

- Low light camera
- Camera for astronomy
- Low light camera for microscopy
- Machine vision

Specifications

Detector type	1/2" interline transfer CCD sensor
# of total pixels	795(H) x 596(V)
# of effective pixels	752(H) x 582(V)
Cell size	8.6um(H) x 8.3um(V)
Shutter speeds	1/50, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/5000, 1/10000, 1/100000 sec.
Minimum illumination	0.0001 lx F1.4
Synchronization	Software sync.
Video output	1 Vp-p, 75ohms, unbalanced
Resolution(H)	570TVL (Center)
SN ratio	More than 50dB (AGC OFF)
AGC	HI: 5-60dB, LO: 5-32dB, MGC: 5-60dB,
Back light compensation	OFF (Default), Center, Lower, Center+Lower
Gamma correction	HI (Y=0.35), LO (Y=0.45), OFF (Y=1.0)
Power supply	DC12V+-10%
Power consumption	1.32W (110mA)
Operating temperature	-10°C - 40°C
Storage temperature	-30°C - 70°C
Dimensions	64mm Dia. X 56.2mm
Weight	295 gr. With cable



Software features

- Full Hardware control (Shutter, Gain, Gamma, etc...)
- Save retrieve functions
- Image Measuring Capabilities
- Images Comparisons

TargetOn Resolving Collimator



Focusing on your MTF applications

- This unit is a precise well corrected collimator, projecting on an interchangeable reticule source, to create an infinite projected test pattern target.
- The interchangeable test target would be either positive or a negative pattern.
- For quality control of a vision system, the illuminated positive target is recommended. The created pattern is an imaginary angular bar-like target.
- The collimator's long focal length, in combination with its large aperture, is ideal for deriving high precision MTF and cut-off resolution of optical systems, such as: cameras, lenses, vision systems, etc.
- The built in focusing feature and interchangeable reticules, combined with optional pillar- type base and led adjustable illumination, makes it a precision multi purpose instrument for optical system testing.



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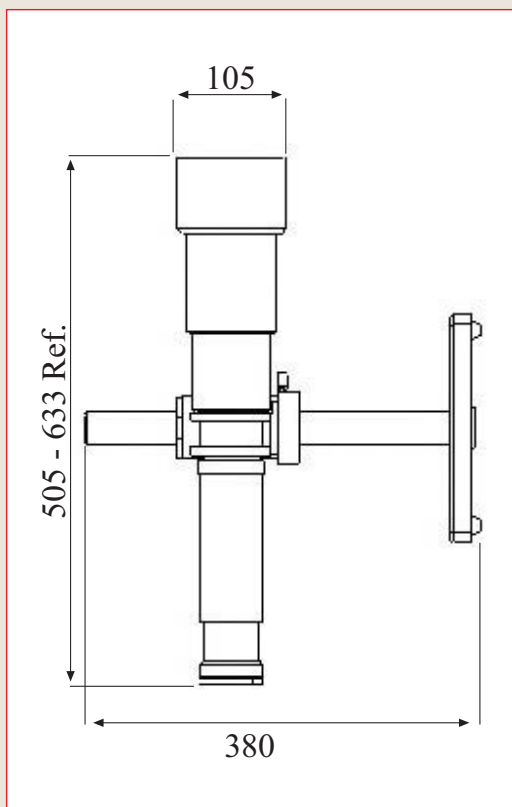
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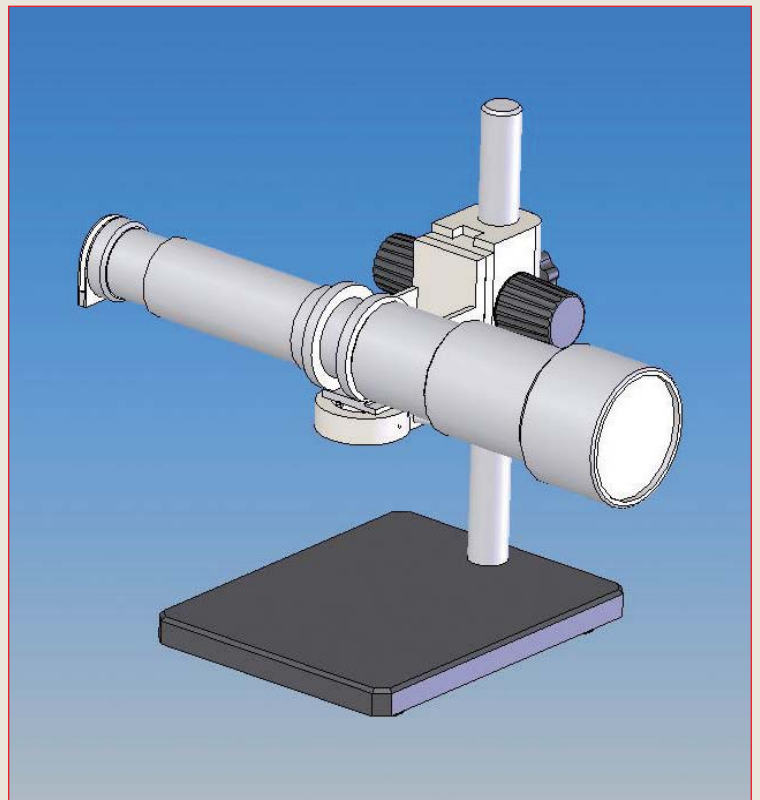
Resolving Collimator

Specifications:

Focal length:	650mm
F# :	1 : 8
Focus:	Adjustable
Mechanical dimensions:	See drawing
Field of view	50 mRad Max
Mechanical Target size:	50X50mm



Dimensions are in millimeters



TargetOn mounted on a stand

Ordering Information:

TargetOn Resolving collimator

Accessories:

STAND - Adjustable height stand

LIGHT - LED Ring illumination (white light) with adjustable power, power supply included



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